CHALMERS
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DApp Revolution

An Investigation into the Nature and Business Models of Web 3.0 Decentralized Applications

Master's thesis in Entrepreneurship and Business Design

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CHALMERS UNIVERSITY OF TECHNOLOGY
Gothenburg, Sweden 2022
www.chalmers.se
Report No. E2022:103

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Abstract

In the early days of the internet, the main offered usability were read-only websites. The first generation of the internet, web 1.0, consisted of Encyclopedia-type sites where users could take part of content but not contribute in any way. Web 2.0, the next generation, has for many years now offered users the possibility of not only reading, but also writing. Users taking part in the content creation, on sites such as Wikipedia, have rapidly increased the amount of content, interactions, and value created online. The rapid growth has been accelerated by companies using platform business models (platforms), establishing themselves in the middle of the interactions to act as facilitators and lower barriers between users. Despite not performing any of the actual value creation, the platform business models enable the platforms to keep a lot of the value while keeping costs very low.

Now, we are at the dawn of the new web 3.0 generation. One of the main technologies of this generation is the blockchain technology, which enables decentralized and transparent solutions. The blockchain movement has been viewed as quite ideologist, often claiming to give the power back to the users. While web 2.0 platforms monopolize the value created online, despite most of it being created by users, web 3.0 allows users to not only read and write, but also own. The technology has led to the development of a new type of interaction facilitator: the decentralized applications (dApps).

This thesis investigates how the nature and business model of dApps compare to web 2.0 platforms. How are they similar/different? Starting off in a simplified version of the Platform Revolution framework, the focus lies on seven models: network effects, openness, architecture, monetization, governance, launch, and metrics. After testing the models on four dApps, we find that all the models need to be considered for dApps as well, but in adapted versions. Based on the considered blockchain characteristics, there is also a need to add two additional models: decentralization and tokenization.

Keywords: business, management, business models, web 2.0, web 3.0, platform, blockchain, dApp, decentralized applications, network effects, openness, governance, digital architecture, monetization, tokenization, decentralization.

Acknowledgements

We would like to direct our sincere thanks and compliments to the web 3.0 community and its self-elected members, for the tireless strive to spread the message about web 3.0. Without their amiable non-proprietary mindset and extensive knowledge, embodied in the sharing of information and collective efforts to build and develop the web 3.0 space, this thesis could not have been written.

Many thanks to Bowman Heiden, for sharing both his illuminating insights on, and his skepticism towards, web 3.0 business models, for encouraging and believing in us (for example by insisting on the feasibility in writing two master's theses during a single semester), for patiently letting us babble on to educate him about web 3.0, and for looking disappointed when we wanted to limit our thesis scope further due to time constraints (hence, we did not).

To the authors of the book *Platform Revolution: How Networked Markets Are Transforming the Economy—and How to Make Them Work for You*, Geoffrey G. Parker, Marshall W. Alstyne, Sangeet Paul Choudary, we would like to say thank you for providing an interesting, useful, and comprehensive foundation for our paraphrase. The title of our thesis, *DApp Revolution*, is a homage to their work.

Last but not least, we would like to thank our closest circle – friends and family – who have put up with everything from complete radio silence, to long monologues on the fascinating essence of web 3.0 during the last five months. We could not have done it without your support and strong belief in us and our abilities.

Table of Contents

Abbreviations

DAO	Decentralized anonymous organization
DApp (dApp)	Decentralized application
DRF	Drife Token
DTC	DTUBE Coin
ERC-20	Ethereum standard for fungible tokens
ERC-721	Ethereum standard for non-fungible token
ERC-1155	Ethereum standard for minting several tokens at once
ETH	Ether (cryptocurrency)
EVM	Ethereum Virtual Machine
ICO	Initial Coin Offering
L0	Blockchain technology layer 0 – blockchain
L1	Blockchain technology layer 1 – third-party integrations
L2	Blockchain technology layer 2 – dApps
NFT	Non-fungible Token
TRVL	Dtravel Token

1 Introduction

1.1 Project Purpose

In the thesis, we analyze business models and value creation mechanisms for emerging platform-like constructions, hereinafter *decentralized applications* or *dApps* on web 3.0.[1] The purpose of the thesis is to suggest adaptations of an analytical framework applicable to the business models of arising and statedly decentralized applications of web 3.0, as well as how and by whom value is captured from the activities on these platforms. Since no comprehensible overview has yet been presented for analysis of decentralized applications, we aim to scratch the surface of web 3.0 by translating perspectives of web 2.0 platforms to this setting.

1.2 Background

In its early days, inventors and users of the internet envisioned it becoming a democratic and decentralized information network. Evidently, their invention has grown to become something much larger. The internet technology is groundbreaking and irreversibly changed the world economy, enabled global cooperation, reach, and open access to information. It laid the foundation for new market structures and continues to create pathways for new opportunities and success. Technological development and increased accessibility have made the internet a part of our everyday lives, reaching all the way into the private homes of millions of users all over the world. It is, without a doubt, one of the most important creations ever invented.[2]

New utilization areas of the internet are developing quickly and continuously. We have left the static, read-only web 1.0 and moved on to the much more interactive web 2.0. Characterized partly by the perception of the internet as an enabling platform upon which services are developed, web 2.0 is driven by the active participation of its users, where the services improve the more the users interact with them.[3] However, instead of giving power to the users, this development has enabled tech giants to take over the market in what is commonly called the platform economy.[4] When today's large actors, such as Google, Microsoft, Amazon, Facebook, Uber, Airbnb and eBay, started to adopt and drive the development of platforms as a business

[1] Application shall be understood in a broad sense, and mean "use", not "app".
[2] Shah, Pooja, CoinDesk, *How Web 3.0 Creates Value for Users, Not Platforms*, 2020 (23-02-2022) https://www.coindesk.com/tech/2020/09/18/how-web-30-creates-value-for-users-not-platforms/.
[3] Levy, Moria, WEB 2.0 Implications on Knowledge Management, *Journal of Knowledge Management*, Vol. 13 No. 1 2009, pp. 120–134.
[4] This expression does not refer to the internet as a platform, but rather platform services offered on the internet.

and organizational model, it became key to their success and domination.[5] As predicted by the early analyzers of web 2.0,[6] platform economy follows a certain value logic, characterized by network effects, user participation, exchange, modularity, etc.[7] This platform based ecosystem has often been described as centralized, as the interaction on platforms is governed by a single or a few platform owners. Acting as middlemen, they earn an immense amount of money on the participation, content creation, and interactions of the platform users. It is obvious that web 2.0 does not live up to the ideological thinking of the early internet and its creators' dreams of democratized access to information and free contribution. This has created an uprising, and the original thoughts and values are dominating the discussion about the approaching web 3.0 – a movement advocating the shift towards blockchain technology.[8]

The emergence of blockchain technology gave new air to the discussion about free and open information on the web, due to its decentralized structure. A crypto community started to take form, as users celebrated the new decentralized technology and the opportunities of it, creating a democratic space of decision making by consensus. Advocates for the blockchain technology and web 3.0 speak of it as a fresh start and a decentralized logic of free information governed by its users – just like with web 1.0. According to them, the vision of web 1.0 is now supported by a more sophisticated and advanced technology on web 3.0 that can provide such decentralization.[9] The internet is transitioning from the platform focused web 2.0 towards a decentralized – open, trustless and permissionless – web 3.0.[10] On the other hand, voices are raised against this utopia about the blockchain technology's ability to disrupt the current structures of the digital market. They question both whether it will be as decentralized as the advocates hope for and whether it can be separated from the web 2.0 environment.[11]

1.3 Problem Statement

As new applications and utilizations related to blockchain emerge, we see tendencies to dynamics and value effects similar to the ones on web 2.0. Platform-like structures have already

[5] Parker, G. G., Van Alstyne, M. & Choudary, S. P., *Platform revolution: How Networked Markets Are Transforming the Economy – and How to Make Them Work for You*, MTM, 2021.
[6] Musser, J. and O'Reilly, T. (2006), *Web 2.0 principles and best practices*, (electronic version), O'Reilly Radar, Fall 2006.
[7] Parker et al., *Platform Revolution*, 2021.
[8] Decentralized data networks, such as blockchains, are not the only new technology components of Web 3.0, which also builds mainly on edge computing, and artificial intelligence. See further below and Mersch, M. and Muirhead, R., *What Is Web 3.0 & Why It Matters*, Fabric Ventures, Medium, 31/12/2019 (18/05/2022) https://medium.com/fabric-ventures/what-is-web-3-0-why-it-matters-934eb07f3d2b.
[9] The Ezra Klein Show, *A Crypto Optimist and a Crypto Skeptic Walk Into a Podcast Studio*, New York Times Opinion, 2021.
[10] Mersch, M. and Muirhead, R., *What Is Web 3.0 & Why It Matters*.
[11] Moxie Marlinspike, *My first impressions of web3*, 07/01/2022, (23/02/2022) https://moxie.org/2022/01/07/web3-first-impressions.html.

started to become more common and grow on web 3.0. Apart from the fact that each blockchain is viewed upon as separate platforms with separate logics – for example Ethereum, IBM Blockchain and Tron[12] – applications built on these blockchains are being formed. Examples of such applications are the non-fungible tokens (NFT) marketplace OpenSea, Brave Browser for digital advertising, the service Coinbase for trading cryptocurrency and Uniswap for managing trading of tokens. There are also more straightforward copies or equivalents of popular platforms on web 2.0, such as the home sharing application Dtravel (similar to Airbnb) or the video sharing application DTube (similar to YouTube). When studying the ecosystem of platforms built on blockchains, we can glimpse the well-known characteristics of web 2.0, with middlemen, network effects and participation value. At the same time, the landscape is still young and difficult to overview, as the emerging blockchain platforms are nearly indistinguishable from core blockchain technology.[13]

If these web 3.0 applications are using similar logics as the ones on web 2.0, will the blockchain actually become the new decentralized web after all? In order to answer that question, the aim of this thesis is to suggest adaptations to an analytical framework for understanding the business models of the arising and statedly decentralized applications of web 3.0, as well as how and by whom value is captured from the activities on these applications. Our suggested title, working towards such a framework, is *DApp Revolution*.

1.4 Research Questions

Below are the research questions which we investigate in the thesis.

1.4.1 Main Research Question

What models should be included in a framework for analyzing web 3.0 decentralized applications?

The main research question is used to create the basis for the adaptations of the framework. "Models" should in this case be understood as descriptions of characteristic phenomena for, and the development of, platforms. For web 2.0, such models would typically regard for example network effects, openness, and governance. We look at models used to analyze web 2.0 platforms and understand how they compare to a web 3.0 setting.

[12] Blockchain Council, *Top 10 Blockchain Platforms You Need To Know About*, (23/02/2022) https://www.blockchain-council.org/blockchain/top-10-blockchain-platforms-you-need-to-know-about/.
[13] Gartner Reviews, *Blockchain Platforms* (23/02/2022) https://www.gartner.com/reviews/market/blockchain-platforms.

1.4.2 Sub Research Questions

The sub research questions which we have formulated are:

1. *How do the models of web 2.0 platforms translate to web 3.0 decentralized applications?*
2. *What additional models can be identified in web 3.0 decentralized application business models?*

Our work takes a starting point in today's value dynamics of web 2.0 platforms. The platform business model has proven to be successful for many actors, as it provides infrastructures for user participation and interaction, which in turn generates content and value. By analyzing web 3.0 applications, focusing on those with obvious equivalents or "sibling applications" on web 2.0, we investigate whether models used for analyzing dynamics and business models on web 2.0 can be applied in the same way on web 3.0 and identify key similarities and key differences. Where there are differences, we look into whether the existing models can be adapted or whether they are irrelevant and suggest updates to the framework accordingly.

By adding characteristics of web 3.0 which are typically not described as part of web 2.0, such as decentralization, to our analysis we get a better understanding of the models used by actors on web 3.0 and the potential benefits and drawbacks. This is used to suggest adaptations to reshape the framework to make it suitable for the evaluation of web 3.0 applications.

1.5 Prior Research and Existing Information

Platforms in their core are like many other businesses when it comes to needing a strategy, having commercial interests, a hierarchical structure, and so on. This means that a lot of the research relating to business in general is applicable to them as well (with some adaptations). Clayton Christensen's theory of disruption and Elinor Ostrom's theory of the commons are two good examples. As interesting as such theories are, we have focused mainly on the parts which differ platforms from traditional pipeline businesses. George Parker, Marshall W. Van Alstyne, and Sangeet Paul Coudary propose a framework containing descriptive models for platform business models on web 2.0 in their book *Platform Revolution*. The research gathered in Platform Revolution is a great summary of relevant research and theory relating to platforms and has been used as a theoretical foundation for the understanding of web 2.0 platform business models. Parker, Van Alstyne, and Choudary have spent most of their careers studying the

platform business model and are prominent actors in the field, the book is a comprehensive and cohesive presentation of their learnings.

The models of interest, such as network effects and openness, have also been studied in more detail. An example of this is Särefjord's Open Platform Design. We have analyzed several models when investigating web 3.0 and focusing on breadth rather than depth, we have not looked further into each of them separately. There are a lot of possibilities for future research, digging into each model from more perspectives. There is also interesting research relating to paradigm shifts. *The Nature of Technology*, by W. Brian Arthur, and *Code 2.0*, by Lawrence Lessig, are two brilliant examples in that category.

1.5.1 Particularly on Web 3.0

There is quite a lot of interest in web 3.0 and its enabling technologies. However, as it is quite a new field, there is a limited amount of material which has had time to go through the rigorous academic process. The literature that we have been able to find consists mostly of collections of articles written by prominent people in the field. It is apparent that the web 3.0 environment converges many different research fields, as many of the collections incorporate different aspects of a chosen technology. An example of this is *Blockchain and Web 3.0* by Massimo Ragnedda and Giuseppe Destefanis (ed.), bringing up social, economic, and technological challenges which arise in connection to the technology.

There are some people who have managed to become experts already. Thibault Schrepel, while focusing on the blockchain and antitrust, has taken it upon himself to create a lot of helpful introductory material in relation to blockchain technology. His explanations of the technology in his book *Blockchain + Antitrust*, accompanied by a series of very pedagogical YouTube videos, have been of great use in understanding theory surrounding the blockchain and when analyzing how that affects the business models needed for decentralized applications in comparison to platforms.

As the academically approved material is limited, we have also had to look elsewhere to build an understanding of the technology and the decentralized applications. Discussion forums, such as GitHub and Discord have been of use, together with various blogs such as Medium as well as the Ethereum website and forum. We believe this is where the most prominent experts – the blockchain community – in the field publish their thoughts. Also, as these spaces gather many interested, dedicated and knowledgeable users of the technology, the comments and discussion related to the posts work almost as a kind of peer-review. This creates a rich body of material and valuable knowledge.

1.5.2 The Contribution of our Thesis

This thesis is different from the existing research as it aims to gather the existing models and characteristics of web 3.0 in a framework. The main contribution of the thesis is not in the presentation of the separate models, regardless of whether they are adapted or not. Instead, it is the collection of the models to consider in decentralized application businesses, presented together in a comprehensible manner.

1.6 Delimitations and Scope

First and foremost, the thesis does not aspire to provide a full framework applicable to the whole web 3.0 environment. That is simply not possible due to both time constraints and due to the fact that the technology and community are still under development and figuring itself out. For the same reasons, we have limited the depth of the analysis of each model in favor of analyzing more of the models. This way, we suggest a *starting point* for a new framework applicable to web 3.0 applications, to be developed along with the web 3.0 sphere.

There are many interesting aspects to both web 2.0 and web 3.0, which are also quite intertwined. However, forced to delimitate the scope of the study with regard to the timeframe, we have focused on the prominent platform architectures of web 2.0 and made analogies and comparisons to web 3.0 value structures. We have taken our starting point in the Platform Revolution framework by Parker et al., which is a delimitation in itself for several reasons. First, we have focused on what models are presented and how in the framework. Second, some delimitations have been through the exclusion of some models. The included models are *network effects, openness, architecture, monetization, governance, launch,* and *metrics*. How and why these delimitations have been made is explained in Section 3.1 *Theory*, and each model is explained in dedicated chapters throughout the thesis.

We have looked at four web 3.0 applications to investigate the environment. The choice of sample applications was based on their suitability for comparison to the web 2.0 platform value structures and their characteristics, which is further explained in Section 2.4 *Research Quality*. This includes their apparent similarity to equivalents on web 2.0. We primarily investigated applications which encourage the participation of individual users, not business to business services. Furthermore, we have avoided looking into hybrid web 2.0/web 3.0 solutions and platforms to make clear conclusions on web 3.0 decentralized applications.

There are many different blockchains with different characteristics and underlying logics. To enable some alignment between the underlying technical aspects of the applications, we

have analyzed applications on public permissionless blockchains compatible with Ethereum (Ethereum Virtual Machine, EVM). We have chosen Ethereum as it is the most used platform which allows for more kinds of applications than crypto transactions.[14] Both public permissionless blockchains and Ethereum are explained in Section 3.2 *Concepts*.

To avoid being too technical and stick to what we know best, we mainly discuss Layer 2 of the blockchain technology in the thesis, as it is the layer where the dApps exist. The layer structure of blockchain technology is elaborated on in Section 3.2 *Concepts*. We only bring up and explain the parts of the blockchain technology which are important in connection to the thesis and avoid complicated technical descriptions which are deemed unnecessary. The chosen concepts are *distribution*, *decentralization*, *immutability*, *public permissionless*, *tokenization*, and *cryptography*. In that spirit, we have chosen not to go into different kinds of consensus mechanisms, even though we see that they might play an important role in for example the governance and architecture of the web 3.0 environment.

The thesis examines the status of web 3.0 as of spring 2022. An important thing to keep in mind is that we are in its dawn and the analysis is based on the information which is available to us at the time being. We have aimed to avoid speculation in relation to potential future issues and possibilities and to merely provide an analytical framework, based on the current state of development. Hopefully, the framework can be used to notice important shifts in the direction of web 3.0.

1.7 Thesis Outline

After this introductory chapter, the methodology used when creating the thesis is presented. It is followed by introductions to the theoretical frameworks and concepts which have been used as a basis for the discussion and analysis. The Platform Revolution framework is briefly introduced and relevant blockchain related theories are presented before concepts relating to them both, such as web 2.0 and 3.0, platforms, dApps, and success, are defined. The sample dApps are presented in Chapter 4.

In Chapter 5, we present the chosen models of the Platform Revolution framework. Each model is handled as a "mini-thesis", starting off with an explanation, simplification, and requisite presentation of the theory in the web 2.0 environment, an analysis of the application of the model to web 3.0 dApps, and a summary of the conclusions that are made. Chapter 6

[14] Ethereum homepage (2022/06/04), https://ethereum.org/en/.

includes a discussion on how the framework should be adapted. Finally, Chapter 7 wraps the thesis up with a conclusion, summarizing and presenting the answers to the research questions.

2 Methodology

This chapter describes the methodology which is utilized in the thesis. First, the research strategy and research design are presented. Second, the research method and the considerations made in relation to research quality are described.

2.1 Research Strategy and the Role of Theory in the Thesis

Theory has been used as a foundation for understanding both platforms and decentralized applications. Starting off in the Platform Revolution framework, the criteria and characteristics of the models were analyzed to see how they are reflected in web 3.0 applications. Theories relating to web 3.0 and blockchains were used to create an understanding of the technology and its implications, to create a basis for the discussion on how to adapt the Parker et al. framework for web 3.0 dApps. For this, Schrepel's theories on different concepts of the blockchain technology were used in combination with content created by the web 3.0 community on forums and blogs.

We have chosen the Platform Revolution framework as it is a comprehensible, structured, and, according to us, accurate description of web 2.0 platforms. It is a graspable explanation of quite a complex subject. The authors' knowledge and experience in the field makes it a dependable source of information. Also, the presentation of the framework aligns with how we intended for our thesis to be presented: In chapters, each focusing on a different model with inserted examples of dApps and platforms. Many of the concepts used by Parker et al. are well established within the area of business research, which makes it easier to find reasoning which can be translated to the web 3.0 environment. It should be noted that the framework consists of a collection of existing business and economic theories with added input and structure from Parker et al. Since the work has its starting point in the framework, we have chosen to accept the interpretation of the pre-established theories made by Parker et al., as their interpretation is the foundation of the framework.

Blockchain and web 3.0 are built and upheld by its community. We have chosen the above-mentioned theories because the information body created collectively by the community is a great source for building an understanding of the nature of the technology. Its decentralized character and world-wide presence make text-based forums essential for efficient information

sharing. By using information shared by the community in these forums, we have been able to get an updated idea of the blockchain technology and its development. This is important as it is quickly changing, making sources outdated. Of course, some content both in the community setting and in the academic setting is created by scholars knowledgeable within business theory. The legitimacy of their work has been of good use for triangulation and comparison between the image drawn up in the community and within the field of business research.

2.1.1 An Abductive Logic of Inquiry

A deductive logic of inquiry, which combines theoretical considerations with established knowledge in a field to form a hypothesis, is the most common approach taken when connecting research and theory. A hypothesis is formed based on existing theories and tested in "reality". In contrast to this, an inductive approach is taken by creating theory based on findings. An abductive approach is when the two logics are combined.[15]

As we started off in an existing theory, the Platform Revolution framework, the approach could be viewed as deductive. However, we have combined the framework with concepts and theories relating to the blockchain technology to analyze and suggest adaptations to make it suitable for the web 3.0 environment. This could be considered to be more of an inductive approach. Since we have combined the two approaches, deductive and inductive, the thesis was performed through an abductive logic of inquiry.

2.1.2 Ontology and Epistemology

It was important to establish what standpoint we were taking when approaching the subject and we considered two philosophical assumptions: ontology and epistemology. *Ontology*, the philosophical study of the nature of reality, defines which assumptions are made when we establish whether something exists. A change in the ontological position results in different definitions of reality. This means that the chosen ontological position determines what we try to understand through research. There are two main standpoints when it comes to ontology in relation to social phenomena: *objectivism* and *constructivism*. An objectivist ontological position presumes that social phenomena exist whether we are aware of them or not, while a constructivist position argues that social phenomena are made real by the understandings and actions of their human creators.[16] Ontology can be contrasted against *epistemology* which is the

[15] Bell, E., Bryman, E. & Harley, B., *Business Research Methods*, Fifth edition, Oxford University Press, Oxford, 2019, pp. 20–24.
[16] Bryman et al., *Business Research Methods*, pp. 26–29.

philosophical study of human knowledge and its nature, origin, and limits. It defines what knowledge is acceptable as true and valid. The chosen ontological position will affect what epistemological approach is most suitable to use. If a phenomenon is treated as something which objectively exists, through an ontologically objectivistic standpoint, the appropriate approach is to measure or count it in some way. Such an approach is epistemologically positivistic. Epistemological interpretivism on the other hand, focuses on the "how" and the "why" of a phenomenon, focusing on understanding instead of explaining. Such an approach is more suitable when questioning and examining the existence of a phenomena, in other words when taking an ontological constructivist standpoint.[17]

In this thesis, concepts such as platforms, dApps, success, and the blockchain are discussed. An ontological standpoint has been taken and expressed, as we discuss these concepts as objects which exist in reality. All of the concepts are to some extent developed or determined by humans, they do not exist without human interaction. However, we have chosen an approach which does not question the concepts' existence but discusses them in terms of what they are and what effects they have, unrelated to how they are perceived by humans. In other words, we handle them as real, existing phenomena. Therefore, the thesis takes an ontologically objectivist standpoint. Treating the concepts as "facts" we have measured, applied, and compared them with each other, assuming true knowledge about them exists. This means that we have used a positivist epistemological approach.

2.1.3 Quantitative or Qualitative Strategy?

The strategies which can be used for data analysis in research can be divided into two main categories: *quantitative* and *qualitative*. A quantitative research strategy involves quantification, or in other words counting, in the data gathering and analysis and it is usually combined with a deductive approach. Qualitative research strategy on the other hand, focuses on words, images, and interpretations of the social world. It is commonly used when taking an inductive approach.[18]

In this thesis, either strategy could have been used. As we take an ontologically objective standpoint with an epistemologically positivist approach, we have gathered data from existing sources and treat that data as facts. We have used blog posts with subjective ideas explaining web 3.0. This approach was chosen based on, as has already been established, the idea that a lot of the most valuable information relating to blockchain technology and web 3.0 is found

[17] Bryman et al., *Business Research Methods*, pp. 29–31.
[18] Bryman et al., *Business Research Methods*, p. 35.

online. Because of the subjectivity of what is expressed, we argue that the content created by the community is comparable to interviews. While using interviews could have been a suitable alternative, we wanted to collect data more broadly to get a more nuanced image. In this sense, our approach has been mainly qualitative. However, as is elaborated on below, we have also included some quantitative elements when comparing the different dApps.

2.2 Research Design

Research design refers to the framework for the collection and analysis of research data, which should illustrate the research relevance in relation to the research questions and relate to certain criteria to prove research quality.[19] This section explains how the research process is designed and why. The practical parts of data collection are covered in Section 2.3 *Research Method* and the research quality evaluations are presented in Section 2.4 *Research Quality*.[20]

2.2.1 Multiple Case Study or a Cross-sectional Design?

We have studied four cases of web 3.0 dApps – Dtravel, Drife, DTube and Minds – in the current state of time to illustrate a snapshot of the web 3.0 development status with regard to how it differs from web 2.0. At first glance, it could be viewed as a cross-sectional design since the aim has been to analyze and compare the traits of these cases.[21] However, it could also be seen as a multiple-case study due to the few cases that were highlighted. According to Alan Bryman, Emma Bell, and Bill Harley this distinction can be hard to make. They propose that the researcher looks at what the focus of the research is.[22] Since our aim was to produce findings that can be generally applicable to web 3.0 applications, we have chosen to call it a cross-sectional design.

Based on a broad resource base, found in academic literature, press, reports as well as online forums and communities, we have been able to identify concepts typical for dApps. The concepts have then been incorporated in the explanation models illustrated in the framework proposed by Parker et al. The adapted models have been applied on the sample dApps and the findings have again been tested in relation to the (emerging) theoretical explanation models that surround web 3.0.

[19] Bryman et al., *Business Research Methods*, p. 44.
[20] Bryman et al., *Business Research Methods*, p. 45.
[21] See Bryman et al., *Business Research Methods*, pp. 58–59 on cross-sectional research design.
[22] Bryman et al., *Business Research Methods*, pp. 64 and 67.

Since the research area is very new, we have triangulated a lot. In this sense, the design resembles what Kathleen M. Eisenhardt calls the *positivistic approach* used in case studies, where "the goal is to extract variables from their context in order to generate generalizable propositions and build theory, often by conducting multiple case studies and using a variety of data collection methods to triangulate and improve the validity of the study."[23] This is a result of us using both case study and a kind of literature or community review to fully understand our research subject and be able to present a reliable theory.[24]

2.2.2 Sample of Cases

The dApps were chosen based on the following criteria:

1) They are run on a public permissionless blockchain;
2) The blockchain they run on is, or is compatible with, the Ethereum blockchain;
3) The dApps are established and widely known in the web 3.0 community;
4) The dApps have obvious equivalents on web 2.0; and
5) The equivalents on web 2.0 are somewhat regarded in Platform Revolution.

Criteria 1) and 2) were based on the fact that these are the most prominent criteria of the web 3.0 environment as of today. These are also the technological characteristics that both symbolize and lay the foundation for the idealistic nature of the web 3.0 movement. Criterion 3) was based on the fact that there is not much written about web 3.0 and to find information we needed to rely on the web 3.0 community forums. These dApps are also deemed to have reached far in their development process and are in the process of trying to both establish their position and to attract investors, which means that a lot of information about the dApps can be found on dApp governed websites and in white papers as well. Criteria 4) and 5) were based on the wish to make accurate comparisons between the dynamics and functions on web 2.0 and the ones on web 3.0 applications based on the current framework for understanding the business models. This would work as a starting point for further research about web 3.0 unique applications or hybrid web 2.0/web 3.0 applications like the Brave browser.

2.2.3 Qualitative with Quantitative Elements

In relation to SRQ 1 and 2, we have performed a mainly *qualitative analysis* based on the framework from Platform Revolution combined with a study of the four chosen web 3.0

[23] Bryman et al., *Business Research Methods*, p. 64.
[24] Compare triangulation in Bryman et al., *Business Research Methods*, p. 61.

applications. The analysis was performed in order to compare and identify similarities and differences between web 2.0 platforms and web 3.0 applications. When looking at these applications we reviewed relevant written material, both academic and community produced.[25] Our analysis in SRQ 2 also contains some *quantitative elements*. We mapped the occurrence of specified traits over the four web 3.0 applications. This approach is typical for cross-sectional research.[26] Finally, a *qualitative analysis* based on the study of the four web 3.0 applications is performed, where the results are further compared to academic and community produced material regarding blockchain and web 3.0.

2.3 Research Method

The research method is the actual technique for collecting data and performing the study.[27] Since the data collection and other methodological aspects differ between the sub-research questions, these are examined separately below.

2.3.1 SRQ 1

To answer the first SRQ (*How do the models of web 2.0 platforms translate to web 3.0 decentralized applications?*) we did an extensive review of material publicly available through literature on blockchain and web 3.0 as well as the web 3.0 community communication and publication channels. Both the Ethereum community and developer pages have been of great use, as well as the Medium platform for publication. The purpose of the review has been to get a proper understanding of both fundamental and more advanced features of web 3.0 with bearing on the Platform Revolution framework.

When doing the review we compared the elements of the framework – network effects, openness, architecture, monetization, governance, launch and metrics – to the theories of web 3.0 and blockchain as found in academic literature, press, reports as well as online forums and communities. In order to do so, we had first simplified the framework. When doing the review, we continuously ranked the elements and models based on importance or applicability on web 3.0. By doing so, we were able to identify the most interesting parts of the framework to analyze from a web 3.0 perspective. The ranking and selection is based on where we have been able to see the most effect by the web 3.0 key characteristics decentralization and tokenization, as well

[25] The community produced material is a cornerstone to our study and the use of it is discussed in Section 2.3 *Research Method*. Relevant literature and academic work can be found in the Literature Table in Appendix I.
[26] Bryman et al., *Business Research Methods*, p. 61.
[27] Bryman et al., *Business Research Methods*, p. 45.

as the actual development stages of the web 3.0 dApps. Since we are still in the dawn of web 3.0, some of the models are simply not possible to draw conclusions from, within the scope of the thesis. Based on the analysis, we were able to formulate hypotheses around which attributes would be the same or similar on web 2.0 and web 3.0 and some reasons for the attributes being the same or different.

2.3.2 SRQ 2

Based on the identified key similarities and differences we formulated attributes on web 3.0 that would either completely lack comparison in the web 2.0 business models or that would take a different expression in the web 3.0 environment. To test our interpretations and hypotheses we investigated the sample dApps and reviewed their white papers and websites. We focused on the white papers, both since they contain the most information about the functionality and logic behind the dApps and since they are a more "stable" source of reference – they are easier to review since they are not as frequently updated as the websites, and when they are, the versions are marked with clear and explicit markings on their numerical order. The study of the websites was useful in order to address the user experience on the platforms, especially the ones that are not yet completely launched (Dtravel and Drife).

Due to the complex nature of the Platform Revolution framework, that is not easily translated into fixed variables, the study of the dApps had the form of an unstructured review. With our background in law, we applied a somewhat legal methodology, formulating requisites from the Platform Revolution framework and used the book as means for interpretation of those requisites when applying them to the dApps. This was also an effect of the fact that some of the variables of importance to the Platform Revolution framework were not easily identified in the dApp resource bases due to lack of information. However, we attempted to document our observations in an observation schedule, to keep track of the variables we had looked at.[28] The observation schedule holds both aspects relating to models in the Platform Revolution framework and attributes related to the blockchain concepts.

The observation schedule follows both quantitative and qualitative logic. To some extent, we have simply noted the occurrence or non-occurrence of certain features on the dApps, but since the nature of the models are not of yes-or-no-character, and since such study would not be beneficial for understanding for example the different use cases and purposes of tokens, we elaborated on relevant details of certain findings. From this study, we were able to draw logical

[28] See Bryman et al., *Business Research Methods,* p. 61.

conclusions about key elements of these dApps and answer the second research question (*What additional models can be identified in web 3.0 decentralized application business models?*).

Finally, to answer our main research question accurately we needed to iterate our findings in relation to the theory material on web 3.0. By doing so, we were able to strengthen our analysis. We have already explained the use of triangulation. Here, we used the web 3.0 community to try to validate our findings and to formulate new models to fit into an analytical framework for web 3.0.

2.4 Research Quality

In order to evaluate the chosen research strategy, design and method, it is important to look at the research quality measures and how they respond to the methodology. While we are concerned with the reliability and validity of our study, we have also acknowledged that the major part of our research would be qualitative, and that these criteria might not be the most suitable for measuring the quality of qualitative research.[29] Instead, we have chosen to address the criteria of quality check for qualitative research as suggested by Bryman et al. To measure *trustworthiness* and *authenticity*, the relevant criteria are *credibility* (corresponding to *internal validity* in quantitative research); *transferability* (corresponding to *external validity* in quantitative research); *dependability* (corresponding to *reliability* in quantitative research); and *confirmability* (corresponding to *objectivity* in quantitative research).[30]

2.4.1 Credibility

Credibility is, simply put, about how we make sure that the research can be accepted in social reality.[31] To do that we need to make sure that the findings correspond to the setting in which they are supposed to be applicable. Since the existence and nature of web 3.0 is very new, there is not much research done on this subject and, as a result, we have relied heavily on the writings of the web 3.0 environment.

Due to the vastness and the diversity in both background, knowledge and means of communication employed in the web 3.0 community, this proved to be easier said than done. To make sure our assumptions are correct we have used both the cross-sectional research design and triangulation.[32] In the review of the theoretical material available about web 3.0, we have

[29] See Bryman et al., *Business Research Methods*, p. 364.
[30] Bryman et al., *Business Research Methods*, p. 363.
[31] Ibid.
[32] See Bryman et al., *Business Research Methods*, pp. 363–364.

used several references to confirm the established view of the web 3.0 aspect that we are trying to analyze. We have to a large extent questioned the reliability of each source and relied heavily on the writing of key people in the web 3.0 movement (such as Vitalik Buterin, the co-founder of Ethereum), the community and developer sites for the various blockchains and web 3.0 applications, and academic literature. Some of these resources are also frequently updated, hence reflect the current view of the state of web 3.0. The Medium publication platform has been of particular use in the process of deciding the reliability of the sources and in triangulation. As far as possible, we have used articles that have been (peer-)reviewed and commented on by the Medium community and liked or "applauded" by many other users. We have also looked at articles published in established "publications", with good and reliable analyzes on the web 3.0 development.

Even though it might be a stretch, we would like to argue that material from these types of sources, although unconventional, has gone through a quite similar process as material published through the academic process. However, as the environment is a lot less controlled, it is of course important to critically evaluate everything that is published, before giving it too much value, and so we have done.

2.4.2 Transferability

Transferability is another issue since we have focused only on public permissionless blockchains and a limited number of cases that have obvious equivalents on web 2.0. We imagine that the identified characteristics and models can differ on other web 3.0 applications that are emerging, and that embrace and employ the traits of the blockchain technology to a larger extent – such as metaverses and hybrid web 2.0/web3.0 solutions. Another huge challenge is the fact that the blockchain technology and the web 3.0 environment is still in its cradle and continuously developed. This means that the thesis, and conclusions in it, might quickly become obsolete.

Here, we would like to point out the fact that the thesis does not aspire to provide a full framework applicable to the whole web 3.0 environment. To explain into which settings the frameworks proposed can be transferred, as a starting point, we have tried to provide a so-called *thick description*[33] of the web 3.0 applications and the environment in large, by mapping out the concepts relevant to the study and the main properties of the web 3.0 applications studied. More on this in Section 3 *Theoretical Frameworks* and Section 4 *Sample dApps*.

[33] See Bryman et al., *Business Research Methods*, p. 365.

2.4.3 Dependability

To illustrate trustworthiness of the study – *dependability* – the material should be auditable, which calls for record keeping of how all parts of the research process has been conducted.[34] Due to the rather intuitive approach to our research process, this is probably where the presentation of our study lacks the most. Furthermore, qualitative research with quantitative elements is often questioned for being "quasi-quantitative" and inexact.[35] Due to the very few numbers of samples, bordering on multiple case studies in terms of research design, we have tried to keep the quantitative elements to a minimum. However, to draw any conclusions at all about the level of occurrence of certain elements in the web 3.0 applications, some quantification is required.

To counteract the lack of dependability, we have described the research elements and choices made through the process in the following parts:

- The choice of the Platform Revolution framework as a basis for our study is motivated in Section 2.1 *Research Strategy and the Role of Theory in the Thesis*.
- The choice of the sample dApps is described in Section 2.2 *Research Design*.
- Section 2.3 *Research Method* motivates and explains how we have chosen the material for reviewing community resources of information on web 3.0. It also explains the choice of the dApp white papers and websites as sources of information about the sample dApps.
- The *observation schedule* illustrates the exact findings on the dApps that we have used as the basis for our analysis. This is done by picking citations from the white papers and websites relevant to the dApps respectively.
- The *literature table* is used to illustrate the body of academic work that we have used for our analysis and why the works are selected.

2.4.4 Confirmability

Confirmability is the criteria to assess whether the study is conducted objectively or not, from the researchers' point of view.[36] For us, this is especially difficult due to our limited technical knowledge as it might make us draw conclusions based on our understanding of web 2.0 platforms and the Platform Revolution framework which we are more familiar with. There are

[34] Ibid.
[35] Bryman et al., *Business Research Methods*, p. 566.
[36] Bryman et al., *Business Research Methods*, p. 365.

also challenges in terms of biases with regard to the idealistic nature of the web 3.0 movement. Opinions are often either fully supportive and embracing the decentralization and trust dogmatism, or very critical towards the statements of decentralization and trust claiming that the web 3.0 is not as decentralized as it seems. To get a more objective validity to our results, we have used more theoretical and technical descriptions of decentralization factors as proposed by academic scholars and compared those to patterns and other findings made on the web 3.0 applications and focused on the functionality of decentralization and how it is embodied in these. In this way, we have tried to neither get too colored by the celebration nor by the criticism towards certain phenomena on web 3.0.

However, even this has proven to be difficult, since even the views of people with technological ability and knowledge differ in their views on this subject. To mitigate the risk of biases, we have again used the triangulation method and made sure to review a broad variety of sources to confirm our interpretations.

3 Theoretical Frameworks and Concepts

In this part of the thesis, the theoretical frameworks explaining the web 2.0 platforms and blockchain technology are presented. This is followed by the definition of concepts which are of importance for the discussion and analysis in the following parts of the thesis. Finally, the sample dApps which are used to test the framework are presented.

3.1 Theory

In this section, the Platform Revolution framework is briefly introduced, followed by the theories relating to blockchain technology.

3.1.1 The Platform Revolution Framework

To suggest adaptations applicable in a framework for web 3.0 applications, we have started off in an existing framework for similar products and services – The Platform Revolution Framework for platforms of web 2.0. The Parker et al. framework consists of ten parts, each describing an aspect which is considered to be important for the functioning of the platform business and organizational model. The parts are network effects, architecture, disruption, launch, monetization, openness, governance, metrics, strategy, and policy. Some of the parts are possible to view as models, kind of like frameworks in the framework, which are easy to follow to set up a platform business model or use to analyze an existing platform business. The

parts that are presented as models in this thesis are: *Network effects*, *openness*, *architecture*, *monetization*, *governance*, *launch* and *metrics*. For the sake of clarity and readability, the models are further presented in separate chapters below. Each model chapter contains a simplification of the model and an in-depth description of key requisites which make up the foundation of the model and how they work on a web 2.0 platform (see Figure 1). Each chapter also contains a separate analysis of how that model applies to the web 3.0 environment, conclusions on what is similar to web 2.0 as well as conclusions on what is different and therefore needs to be adapted.

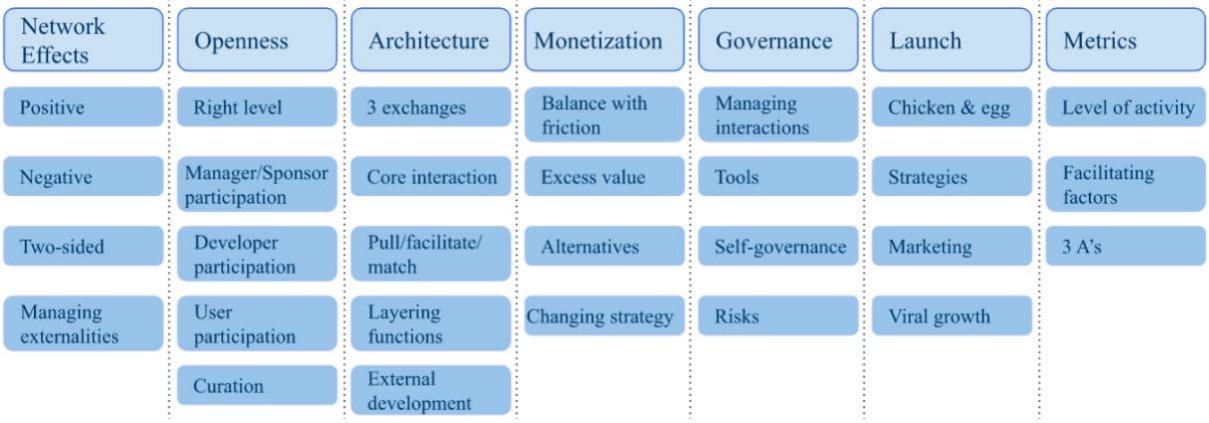

Figure 1: An illustration of the seven models which are presented and the requisites which are focused on in each model.

The remaining parts of the Platform Revolution are of more explanatory nature and less suitable as models. *Disruption* is presented in the concept of success on web 2.0 below. The remaining part of the framework, *Strategy*, is partly illustrated below with the purpose to lay the foundation for a market understanding on which the thesis is based. The rest of the Strategy chapter is not part of this thesis. *Policy* is avoided altogether as it relates to how platform businesses should and should not be regulated by law. Competition law and fair pricing, data privacy and security, tax and labor are some examples of regulatory issues closely related to the platform business model which cause negative externalities to occur. Despite its relevance, the lack of regulation regarding blockchain technology, web 3.0 and crypto communities, makes it too early to dig deeper into this part of Platform Revolution. We also argue that the regulatory issues raised by the growth of web 2.0 will be very much alike on web 3.0, since in this context, blockchain technology simply is a new way of providing internet.[37]

[37] On the topic of monopoly powers, fair trade, and other business regulations, we recommend turning to Schrepel, T., *Blockchain + Antitrust: The Decentralization Formula*, Edward Elgar Publishing Limited, Cheltenham, UK, 2021, and de F., Primavera & Wright, A., *Blockchain and the Law: The Rule of Code*, Harvard University Press, Cambridge, Massachusetts, 2018.

3.1.1.1 The Web 2.0 Competitive Landscape

The platform evolution has paved the way for a new competitive landscape. Where the traditional resource-based view of the firm is no longer sufficient to make accurate analysis. On the contrary, platforms strive to own as little physical assets as possible. In this new landscape, Porter's *five forces model* is insufficient for pinpointing advantages and the platform owners must seek other ways to analyze their position.[38] Competition occurs unexpectedly by new types of competitors as well as between the platforms themselves.[39]

Parker et al. describes the competitive landscape as a three-dimensional chess, where platform pieces compete against other platform pieces and against partner pieces, and where the partners compete against other partner pieces. At the same time, the board itself is redrawn. Firstly, by managing network effects, not only do platforms divide the value created in the ecosystem – but they can also increase that value that can be distributed.[40] Secondly, managerial influence is to a larger extent situated outside the firm, with partners in the ecosystem. Competitive advantage springs from the power of these ecosystems' total value creation rather than relying on individual products or services. This offers a new complexity to the market which a successful strategy needs to account for. The ecosystem participants need to regard the other participants as both partners and competitors. Understanding this, platforms should observe ecosystem partner activities, in what can be considered a resource pool outside the firm itself. A way of managing the resource pool is to catch the most promising opportunities and ideas. Reassured by the fact that the total value in the ecosystem will be shared, the platform firm can help partners to catch other opportunities.[41]

3.1.2 Blockchain

First introduced in a white paper created by Satoshi Nakamoto in 2008, many view the blockchain technology as a response to the crash of the financial industry. The privacy and security of the Internet had been criticized for many years, and the middlemen were (and still are to some extent) viewed as almighty and difficult to control. A technology which enabled the integrity of data to be kept, as transactions of value and information are made without the involvement of a central third party, sounded like it was sent from the heavens. Now 14 years

[38] Parker et al., *Platform Revolution*, p. 207– 210.
[39] Parker et al., *Platform Revolution*, p. 204.
[40] Parker et al., *Platform Revolution*, p. 210.
[41] Parker et al., *Platform Revolution*, pp. 211–212.

have passed since the technology was first presented and people are struggling to understand the full possibilities and implications it creates.[42]

Explained in a simplified manner, a blockchain is a list of transactions comparable to a ledger or a database. It is chronologically organized, meaning that the transactions between its users are stored in the order they were made.[43] Instead of the transactions being kept in a long list, they are split into smaller groups. One group of transactions is called a block. The activity of adding new blocks on a blockchain, and verifying their validity, is called mining. The mining process is also how new coins are generated. This happens when the miners, the users who are doing the mining, are rewarded with coins for the mining work they perform.[44]

In order to make the blocks stick together like a chain, the data in a block (Block 1) is put into an algorithm which turns it into a long string of symbols, called a hash. The hash, which is kind of like a representative of the data in the block, is included in the following block (Block 2). This means that the hash for Block 1 is part of the data which is used to generate the hash representing Block 2. That hash is then included in the following block, Block 3, and this process keeps on going for each new block.[45]

A blockchain uses a specific algorithm to generate hashes for the blocks. This means the hash always has the same number of symbols, no matter how much data is put into it, and makes it easier to test if the hash of a block is correct. Even the smallest change to the data, such as changing from an uppercase to a smaller case letter, generates a completely different hash. This means that if any data is changed in a block which is part of a blockchain, the hash representing it is also changed. If this happens, the hash will no longer match the hash in the following block. Any tampering in an existing block will therefore be noticeable to actors verifying the blocks, and not accepted. This is one reason a blockchain is immutable.[46]

The technology has many interesting characteristics, which are presented further below. Before moving on to the characteristics, the layers of the blockchain technology are briefly explained. There are many ways of describing the layers of the technology. We have chosen a simple version which we believe makes the most sense in relation to dApps. In this version, there are three layers. Layer 0 (L0) is where we find the actual foundational structures of the blockchains, determining the programming language and rules of a blockchain. On Layer 1 (L1)

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[42] Tapscott, D. & Tapscott, A., *Blockchain Revolution*, Penguin Random House, New York, 2016, pp. 4–5.
[43] OECD, *OECD Blockchain Primer* (18/05/2022) https://www.oecd.org/finance/OECD-Blockchain-Primer.pdf.
[44] Jimi S., *How does blockchain work in 7 steps — A clear and simple explanation.*, Good Audience, Medium, 06/05/2018 (04/06/2022) https://blog.goodaudience.com/blockchain-for-beginners-what-is-blockchain-519db8c6677a.
[45] Rosich, A., *What Is Hashing? [Step-by-Step Guide-Under Hood Of Blockchain]*, BlockGeeks, 04/05/2020 (04/06/2022) https://blockgeeks.com/guides/what-is-hashing/.
[46] Ibid.

we find the third-party integrations which are used together with the L0 blockchains to enable higher transactions rates and scalability. Next there is Layer 2 (L2), which is where the actual applications exist. This is the layer which users interact with when using dApps.[47]

3.1.2.1 Distribution

One key differentiating factor of blockchain technology compared to traditional servers is its geographically *distributed* nature.[48] Instead of listing the financial transactions made by or through one firm, it chronologically records transactions between parties in what is often a huge network.[49] Hence, the technology resembles the structure of a database that relies on thousands of computers and servers all over the world. A copy of the database is stored, and continuously updated as new transactions are made, on every node in a peer-to-peer network, which means that the control of the database is inevitably shared between the nodes on the network.[50] As such, nodes are by definition all "computers" or connection points that hold the blockchain.

3.1.2.2 Decentralization

This peer-to-peer model is what lays the foundation of the *decentralized* elements of blockchain governance.[51] The concept of decentralization means that there is no single force or authority that can independently make decisions regarding the blockchain. No entity can execute censorship or block participants ("gatekeepers").[52] Thibault Schrepel refers to two main features of decentralized systems: 1) *coordination*; and 2) *informed decision making*. In relation to coordination, decentralization leaves room for governance by the majority since no central force can shut out particular users. On the other hand, decentralization can make coordination difficult due to the lack of a central entity with a final say. Hence, there is risk of fractioning.[53] In relation to informed decision making, decentralization incentivizes the users to guard their own interests and therefore to a larger extent make sure to have all the needed information. This makes decisions more informed. Also, information can be shared peer-to-peer instead of ending up in a decision-making central power and being interpreted, distorted and/or acted upon by

[47] This is based on information in OECD, *OECD Blockchain Primer* and on Binance Academy, *Vad är lager 1 i en blockkedja?*, Pub. 22/02/2022, Upd. 06/04/2022 (04/06/2022) https://academy.binance.com/sv/articles/what-is-layer-1-in-blockchain. An alternative theory on the layers of blockchain can be found in Schrepel, T., *Blockchain decentralization (4/15)*, YouTube, 10/02/2022 (26/05/2022) https://www.youtube.com/watch?v=Ou2RPgqgqfc .
[48] Schrepel, *Blockchain + Antitrust*, p. 27.
[49] OECD, *OECD Blockchain Primer*, p. 4. Compare to the Investopedia, *General Ledger Definition*, 29/04/2022, (18/05/2022) https://www.investopedia.com/terms/g/generalledger.asp.
[50] OECD, *OECD Blockchain Primer*, p. 4-6.
[51] Schrepel, *Blockchain + Antitrust*, p. 24.
[52] Ethereum, *Web2 vs Web3*, upd. 12/04/2022 by @samajammin (04/06/2022) https://ethereum.org/en/developers/docs/web2-vs-web3/.
[53] Ethereum, *Web2 vs Web3.*

anyone other than the users. However, this creates the risk that information gets stuck somewhere in the network, and all users might not have acquired the same information.[54] This connects to the spread and complex structure of decentralized networks. Where centralized networks can be said to have something of a diameter and a core point through which all information is distributed, the decentralized network follows no such form.[55] The decentralized structure makes broadcasting information across and between edges of the network a slow process. They also take up a lot of computational power.[56]

On the other hand, in the network structure in the decentralized system there is no single point of failure. This connects to the distributed infrastructure as well and provides stability and reliability to the network functions and applications. While a malicious attack on the central authority in a centralized network will take down the whole network, a distributed and decentralized system can still run, since a copy is stored on every node in the network.[57]

Vitalik Buterin, one of the co-founders of Ethereum, pinpoints three axes of centralization/decentralization when analyzing software: *Architectural*; *Political*; and *Logical*. Architectural decentralization refers to the number of computers constituting the foundational system. Political decentralization refers to the number of individuals or entities controlling the computers. Logical decentralization refers to the user or participator structure and if the functions provided by the system will remain even if it is fractionated.[58] Buterin argues that a blockchain is politically decentralized as well as architecturally decentralized, since no one controls it and since there is no central point of failure. However, he argues, blockchains are logically centralized, since "there is one commonly agreed state and the system behaves like a single computer".[59] Albert Wenger agrees that blockchain is logically centralized, but adds another parameter: that blockchain is organizationally decentralized, meaning that several nodes without any other connection to each other can keep copies of the blockchain ledger.[60] In our analysis, the organizational decentralization proposed by Wenger combines the

[54] However, Schrepel points out that consequences from decisions made in a decentralized system tend to only hit the ones who have made the decisions. In a centralized one, even wrong decisions affect the whole network. Schrepel, *Blockchain + Antitrust*, pp. 52–53.
[55] Ethereum, *Web2 vs Web3.*
[56] Schrepel, *Blockchain + Antitrust*, pp. 55–56. Ethereum, *Web2 vs Web3.*
[57] Ethereum, *Web2 vs Web3.*
[58] "[...]does the interface and data structures that the system presents and maintains look more like a single monolithic object, or an amorphous swarm? One simple heuristic is: if you cut the system in half, including both providers and users, will both halves continue to fully operate as independent units?", Buterin, Vitalik, *The Meaning of Decentralization*, Medium, 06/02/2017 (22/05/2022) (https://medium.com/@VitalikButerin/the-meaning-of-decentralization-a0c92b76a274.
[59] "Blockchains are politically decentralized (no one controls them) and architecturally decentralized (no infrastructural central point of failure), but they are logically centralized (there is one commonly agreed state and the system behaves like a single computer)." Buterin, *The Meaning of Decentralization*.
[60] Wenger, Albert, *Bitcoin: Clarifying the Foundational Innovation of the Blockchain*, Continuations, 15/12/2014, (22/05/2022) https://continuations.com/post/105272022635/bitcoin-clarifying-the-foundational-innovation-of.

architectural and political decentralization as proposed by Buterin. It is clear that analyzing the blockchain space from a decentralization perspective is a complex task which needs to take into account many variables.

As Schrepel points out, the level of decentralization is furthermore decided upon somewhere – but how and by whom? Well, on blockchain, the decision is embedded in the technology. If the technology layers are decentralized, architecturally or in other ways, the level of decentralization in the upper layers and applications tends to be affected.[61] Schrepel argues that decisions about decentralizations follow a bottom-up structure, where the lower layers determine the level of decentralization in the upper ones. While we believe this to be partly true, we also think that the layering model is quite an inexact illustration of the complex architectural structure and ecosystems connected to the blockchain environment – especially if transferred to web 3.0. For simplicity and our own sanity, we have embraced the layered explanatory model, but we want to point out that for example decentralization caused by use of for example centralized storage space or other third-party providers might not fit. So, if the decentralization is set in multiple layers, it is also true that the decentralization of the blockchain on which a dApp is run, does not mean that the dApp itself is decentralized at all or to the same extent.[62] Since the subject of this thesis is the dApp layer, this will be the main focus when analyzing decentralization and will be further elaborated on below.

3.1.2.3 Immutability

That the blockchain is *immutable* means that once a transaction is recorded to the blockchain, it cannot be reversed.[63] This works to build trust on the blockchain. The validation of nodes is part of the *consensus mechanisms* that characterizes blockchain technology.[64] Consensus is a technical term describing the process of sharing information among nodes in the network, related to the distribution and decentralization of blockchain. Every node has a copy and can trust the copies to remain unaltered.[65] For validation the most established method (consensus

[61] Furthermore, the DAO(s) has some influence on the code, see Section 3.2 *Concepts*.
[62] Gratzki, *Decentralized Application (dapp) updates and governance*, Medium, 20/02/2020 (04/06/2022) https://medium.com/@gratzkis/decentralized-application-dapp-updates-and-governance-831f33d8368a.
[63] Palladino, Santiago, *Ethereum for Web Developers* [Electronic resource], Apress, 2019, Chapter 1, p. 2. Reversion of a transaction is theoretically possible, but it would require the validation of all nodes on the network, which is extremely unlikely to occur.
[64] Schrepel, *Blockchain + Antitrust*, p. 33.
[65] Werbach, Kevin, *The blockchain and the new architecture of trust*, MIT Press, Cambridge, MA, 2018, p. 7.

protocol), also used by Ethereum, is *proof-of-work* which functions to incentivize the nodes to make correct validations.[66] Unfortunately, we will not be able to discuss further here.

3.1.2.4 Public and permissionless

Blockchains can be *public* or *private*, *permissioned* and *permissionless*, whereas public and private refers to who can see and use the blockchain while permissioned and permissionless refers to who can validate transactions on the blockchain.[67] Public and permissionless blockchains, which are the interest of this thesis and also is the nature of Ethereum, means that anyone can use and see the blockchain content and anyone can be a validator of transactions – to compare to, say, a public and permissioned blockchain, where anyone can use and see the content, but only a few can validate the transactions.[68] This later model becomes more centralized. Hence, permissioned versus permissionless, as well as centralization versus decentralization, is not a binary matter, but rather scales where the level can vary.[69] Private blockchains are always permissioned – it is impossible to add to something you cannot access. They have a manager who can often reverse or edit the ledger.[70] Since they are not compliant with the core ideology of decentralization that characterizes blockchain, some argue that they are not blockchains at all.[71]

Permissionless blockchains have several positive traits as well as drawbacks, which mainly mirrors the pattern described under Section 3.1.2.2 *Decentralization* above. First and foremost, they are the facilitators of *decentralization*, since anyone can participate, and each participant is equal as has been explained above.[72] The distributed and decentralized nature with incentivized validators increases *security* of the network. This explains the layered approach to technically embedded decentralization mentioned above. An issue or factor for the participants on permissionless blockchains to consider is the risk of forking.[73] The efficiency struggles of decentralized systems might pose a risk for the coherence and consensus in the ecosystem which

[66] Ethereum also explores the *proof-of-stake* consensus protocol. For further reading, see Ethereum, *Consensus Mechanisms*, (updated regularly by the Ethereum community members, last upd. 16/05/2022 by @minimalsm) (04/05/2022) https://ethereum.org/en/developers/docs/consensus-mechanisms/.
[67] Schrepel, *Blockchain + Antitrust*, p. 31–32.
[68] Schrepel, *Blockchain + Antitrust*, p. 32.
[69] Compare Schrepel, *Blockchain decentralization (4/15)* and the design elements discussed by Palladino, in *Ethereum for Web Developers*, p. 11.
[70] Seth, Shobhit and Rasure, Erika, *Public, Private, Permissioned Blockchains Compared*, Investopedia, 29/06/2021, (22/05/2022) https://www.investopedia.com/news/public-private-permissioned-blockchains-compared/.
[71] Palladino, S. *Ethereum for Web Developers*,, p. 11 and Schrepel, *Blockchain + Antitrust*, p. 32, and his comparison between "internet" and "intranet".
[72] On a technological level. However, compare the concept of DAOs below. Permission.io, *Permissioned vs. Permissionless Blockchains Explained*, 18/05/2021, PermissionIO, Medium (04/06/2022) https://medium.com/permissionio/permissioned-vs-permissionless-blockchains-explained-415331c58e69.
[73] Ibid.

might result in a split of the chain. Another factor is that the technology does (naturally) not fully prevent criminal or malicious activities conducted by users on the chain. Even though the distribution limits the damage caused by hacker attacks towards the code, malicious activity can still take place on the dApp run on a permissionless blockchain by for example fraud.[74] This poses the limit to the technology.

3.1.2.5 Tokenization

There are two types of digital assets which exist on a blockchain: cryptocurrency and crypto tokens. The cryptocurrency of a blockchain, such as bitcoin on Bitcoin or ether on Ethereum, is part of the blockchain itself, native to it, which means that it is a logic which is built in the protocol of a blockchain as it is created. Tokens on the other hand, are programmed through smart contracts "on top" of existing blockchains.[75] Instead of getting their characteristics and rules from the blockchain code, tokens can be individually shaped in smart contracts.[76] To make digital assets work across several blockchains, standards for their creation have been established. Examples of common standards are the ERC20[77] for fungible tokens (such as cryptocurrency) and the ERC721 for non-fungible tokens (such as tokens representing art).[78] Interoperability between blockchains and dApps is further discussed in Section 3.2.3 *Ethereum*.

Both types of assets are stored on user accounts, which are accessed through a type of interface which is commonly called a wallet. There are many different wallet providers, with different pros and cons which will not be discussed here. The important thing to understand is that the asset is not stored in the wallet. The wallet is only an interface tool which can be used to manage the assets, by for example checking the balance of the account or sending transactions. The asset is always stored on the account, which means that they can be accessed through different wallets and are never tied to one in particular.[79]

When an asset is tokenized, which both physical and digital assets can be, it is transformed into a token. That means the token is "connected" to a specific asset and comes with a lot of benefits. It creates a digital version of the asset, which is ownable, storable, and transferable on

[74] Ibid.
[75] It should be mentioned that nothing prevents web 2.0 platforms from creating tokens which could be used for transactions on their platforms. The additional opportunities created by the blockchain, such as the traceability, immutability, and interoperability, just makes it much more interesting and the tokens more valuable.
[76] Rsk, *The Difference between a Cryptocurrency and a Token* (04/06/2022) https://developers.rsk.co/guides/get-crypto-on-rsk/cryptocurrency-vs-token/.
[77] Ethereum, *ERC-20 Token Standard*, (updated regularly by the Ethereum community members, last upd. 23/05/2022 by @spilehchiha) (04/06/2022) https://ethereum.org/en/developers/docs/standards/tokens/erc-20/.
[78] Ethereum, *ERC-721 Non-fungible Token Standard*, (updated regularly by the Ethereum community members, last upd. 17/04/2022 by @superphiz) (04/06/2022) https://ethereum.org/en/developers/docs/standards/tokens/erc-721/#top.
[79] Ethereum, *Ethereum Wallets* (04/06/2022) https://ethereum.org/en/wallets/.

a blockchain. The token also enables the history of the transaction of the asset to be saved and traceable, which makes it possible to create unicity and provenance for intangible objects.[80]

> *"On-blockchain token systems have many applications ranging from sub-currencies representing assets such as USD or gold to company stocks, individual tokens representing smart property, secure unforgeable coupons, and even token systems with no ties to conventional value at all, used as point systems for incentivization."*[81]

Several tokens can be connected to the same asset and represent parts of it. This works like owning shares in a company and creates the possibility of shared ownership on the blockchain. It means the positive characteristics of the technology, such as immutability, trustlessness, and transparency, can be used to stabilize and secure investments in many kinds of assets which are commonly not shared, such as houses or paintings. Traditional intermediaries can also be avoided, which makes transactions faster and cheaper than if they were performed in a traditional way.[82] An additional benefit is that no central authority can withhold assets, as long as a user is able to access their account, they can access their assets.[83]

Tokenization enables capturing value which is usually difficult to capture. A good example is how miners use computer power to mine and are rewarded with cryptocurrency, which is possible to own, store, and trade. The use of tokenization has become a common practice on blockchain applications used to encourage and stimulate interactions on the network. The users are rewarded in tokens for intangible values, such as their attention, their creation of content, or positive feedback from other users. Such tokens are usually created specifically by the dApp they are handed out on but can be traded for actual money or other types of tokens if they are established enough that other users are interested in buying them.[84]

Using tokens connected to assets come with some challenges. One example is the so far unestablished applicability of national, regional, and international regulations on token ownership and transactions. When it comes to the tokenization of physical assets, the challenges also include the connection between the digital and the physical world, and how to ensure it. So far, there is a need for an actor, often called an oracle, confirming events in the real world

[80] Ethereum, *Introduction to Dapps*, (updated regularly by the Ethereum community members, last upd. 02/05/2022 by @minimalsm) (18/05/2022) https://ethereum.org/en/developers/docs/dapps/.
[81] Ibid.
[82] OECD, *OECD Blockchain Primer*, p. 8.
[83] Parker, T., *An Introduction to Minds: A deep dive into the main features of this open source, free speech social network*, Reclaim the Net, 12/05/2021 (04/06/2022) https://reclaimthenet.org/minds-review/.
[84] Sharma, Rakesh, *Non-Fungible Token (NFT) Definition*, Investopedia, 26/02/2022 (04/06/2022) https://www.investopedia.com/non-fungible-tokens-nft-5115211.

in code accessible by smart contracts on the blockchain. This means that transactions of tokens connected to physical assets are not (yet) decentralized.[85]

3.1.2.6 Cryptography

When talking about blockchain, a lot of terms involving crypto, such as cryptocurrency and crypto tokens, tend to pop up. Crypto means concealed or secret and concealed writing, cryptography, is an important tool used in blockchain technology. Cryptography enables transactions of cryptocurrency and tokens by guaranteeing their security, removing the need of a central authority, and removing the risk of for example double-spending. Depending on its configuration, it can also create the possibility of full or pseudo anonymity. It fills many purposes, such as verifying transfers of tokens. In a transaction, cryptography works by using algorithms to store and transfer data in a confidential way, so that only the account the data is intended for can receive, read, and process it. Cryptography also ensures the authenticity of the participants and the transaction itself.[86]

There are three types of cryptography used with blockchain technology. *Symmetric encryption* uses one single confidential key to encrypt, send, and decrypt a message. It is the simplest type of cryptography, and anyone who knows what the confidential key is can decrypt the message. The *asymmetric encryption* uses a combination of public and private keys connected to each account on the blockchain. The public key is comparable to the number on a bank account, an address others can know of and use to send assets to a certain person. It is used to encrypt the message by the sender. In that scenario, the private key is more like the pin code or a password, something that should always be kept secret by the owner of the account. It is used to decrypt the message by the receiver. This method of encryption is the one that helps with the authentication and encryption of cryptocurrency transactions. The final type of encryption is the above-mentioned process of *hashing* used when adding blocks to a blockchain. This mainly fills the function of verifying the integrity of the data in the blocks and helps ensure the structure of the blockchain. Independent of what type of cryptography is used and how, alone or in combination with other types, digital signatures are used as a complement to ensure the identity of actual people using the blockchain technology.[87]

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[85] Ethereum, *Oracles*, (updated regularly by the Ethereum community members, last upd. 06/05/2022 by @minimalsm) (04/06/2022) https://ethereum.org/en/developers/docs/oracles/.
[86] Seth, S., E*xplaining the Crypto in Cryptocurrency*, Investopedia, 15/05/2022 (04/06/2022) https://www.investopedia.com/tech/explaining-crypto-cryptocurrency/.
[87] Ibid.

3.1.2.7 Issues Surrounding Blockchain Technology

As is the case with most technologies, the blockchain technology is not perfect. There are several issues which need to be resolved for the technology to reach its full potential and deliver on all that is expected of it. First, there is the issue of *scalability*, also known as the *scalability trilemma*. It states that a blockchain can have decentralization, scalability, or security, usually two of them in combination, but there is yet to be a solution which enables all three. The scalability of a blockchain means the capacity of the network, in terms of the number of nodes operating, number of transactions that are processed and the speed of the processes. As the scalability trilemma makes clear, tradeoffs need to be made. The scalability is commonly the aspect which is lacking. Due to the complexity and energy intensity of the consensus mechanisms used when adding blocks to the blockchain, limited scalability means that bottlenecks are created. That makes transactions slow and expensive.[88]

As has been mentioned, there are many different blockchains. Those blockchains offer many different dApps. When users start gathering value on one dApp, they will want to be able to use that value on most other dApps, independent of what blockchain they are deployed on. For this to be possible, there needs to be *interoperability*. As blockchains are designed today, there is no inherent way of communicating between them – there is an interoperability issue. The best way for a dApp to ensure interoperability with other dApps is to deploy it on the same blockchain or on a blockchain which actively enables interoperable solutions. Alternatives are also starting to arise, in the shape of "bridges" between the blockchains which will enable cross-chain transactions.[89] However, these have been criticized as centralized and potential security weaknesses. The critics claim that if cross-chain interoperability is ever to be a common phenomenon, which they are not sure should be the case, there is still a lot of work to be done.[90] The key takeaway is that blockchains are by default non-interoperable in relation to other blockchains. However, initiatives such as Ethereum have explored the opportunities to add such features for useability purposes.

[88] More on scalability and possible solutions to the issue can be found on crypto.com, *A Deep Dive Into Blockchain Scalability*, 03/03/2020 (04/06/2022) https://crypto.com/university/blockchain-scalability.
[89] Shaan, R., *Blockchain Interoperability*, Towards Data Science, Medium, 17/06/2018 (04/06/2022) https://towardsdatascience.com/blockchain-interoperability-33a1a55fe718.
[90] For an example of the ongoing discussion, see vbuterin comment to post *[AMA] We are the EF's Research Team (Pt. 7: 07 January, 2022)*, Reddit, January 2022 (12/06/2022) https://old.reddit.com/r/ethereum/comments/rwojtk/ama_we_are_the_efs_research_team_pt_7_07_january/hrngyk8/.

3.2 Concepts

There are many different concepts in the thesis which need to be properly defined. In this section, the concepts of web 2.0, web 3.0, Ethereum, Platform (on web 2.0 and dApp on web 3.0), DAO and success (on web 2.0 and web 3.0) are presented.

3.2.1 Web 2.0

The first generation of the Internet, web 1.0, did not offer any kind of interaction for the users. Instead, it was characterized by static websites limited to showing information. An Encyclopedia is a suiting example of the most common type of website on web 1.0, an information portal which did not allow for users to add comments, make changes, or give feedback. When the era of the participative web 2.0 was entered, a lot of this changed. Users could now start interacting with other users and generate and share information and data. Not being limited to reading, but also being able to contribute to websites changed the users' interaction with the Internet and transformed them from passive to active actors. Wikipedia embodies this change, and makes an illustrative example of what can be achieved when users are free to collaborate.[91] The site was launched early in 2001, and twenty years later it contains over 58 million articles, and users edit its content 1.9 times per second.[92] This is also the time during which social media platforms were created and started encouraging users to hop on the trend of participative and collaborative behavior online.[93]

3.2.2 Web 3.0

Entering the era of web 3.0 we are, according to some, at the dawn of the next generation of the Internet. One of the main characteristics of Web 3.0 is the decentralized nature of the technology that it is built on – the blockchain technology. It is expected to be inclusive, permitting anyone who is on the network to use the offered services without any central authorities with the ability to deny anyone access. In addition, there is no individual central force that can block a user's content. The technology also makes web 3.0 transparent and trustworthy and as a blockchain is a type of distributed ledger, which relies on thousands of computers, web 3.0 servers cannot go down.[94] Finally, and one of the main differences for users of the internet, web 3.0 will allow for

[91] Ragnedda, M. & Destefanis, G. (red.), *Blockchain and Web 3.0: Social, Economic, and Technological Challenges*, Routledge, London, 2020 p. 2–3.
[92] Wikipedia, *Wikipedia*, (18/05/2022), https://en.wikipedia.org/wiki/Wikipedia.
[93] Ragnedda & Destefanis, *Blockchain and Web 3.0*, p. 3.
[94] Ethereum, *Web 2 vs Web 3*.

another dimension of user activity – the ownership and transfer of value.[95] One way to express it is that web 3.0 is about the democratization of the Internet.[96]

It is important to note that the era of web 3.0 is not all about blockchain technology. Some argue that this is the generation of the Internet where computers are the ones generating new information.[97] Artificial intelligence, including machine learning and autonomous decision making, will play huge roles together with data. In combination, all of the technologies will enable faster and more adaptable internet where the users have more control over the value they create as well as their privacy.[98] *Fabric Ventures*, a publication on Medium supporting open economy, states:

> *"Web 3.0 enables a future where distributed users and machines are able to interact with data, value and other counterparties via a substrate of peer-to-peer networks without the need for third parties. The result: a composable human-centric & privacy preserving computing fabric for the next wave of the web."*[99]

There are still some limitations to web 3.0 which will have to be resolved to enable increased adoption. As has been mentioned, its decentralized nature of blockchain limits the scalability and creates slower transactions. The dApps which the users interact with usually require more steps, such as initial purchases of cryptocurrency or tokens or additional education in relation to the technology, before allowing interactions. This creates friction which might decrease adoption. Furthermore, the integration between existing web 2.0 browsers and web 3.0 dApps is lacking. This makes the dApps less accessible to users compared to the web 2.0 equivalents. Finally, using blockchain technology creates a lot of costs. This often means a lot of the most successful dApps choose to not deploy all their code on a blockchain, in order to keep their costs down, which leads to less of the benefits created by the blockchain technology being actualized in the dApps.[100]

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[95] Ragnedda & Destefanis, *Blockchain and Web 3.0*, p. 3.
[96] Fazekas, L., *Web3 is not About Blockchain or Decentralization*, Geek Culture, Medium, 15/02/2022 (12/06/2022) https://medium.com/geekculture/web3-is-not-about-blockchain-or-decentralization-f78fda0d3f9b.
[97] Rudman, R., and Rikus, B., *Defining Web 3.0: Opportunities and Challenges*, Electronic Library, Oxford, vol. 34, no. 1, 2016: 132–154.
[98] Mersch, M. and Muirhead, R., *What Is Web 3.0 & Why It Matters*, Fabric Ventures, Medium, 31/12/2019 (18/05/2022) https://medium.com/fabric-ventures/what-is-web-3-0-why-it-matters-934eb07f3d2b.
[99] Mersch, M. and Muirhead, R., *What Is Web 3.0 & Why It Matters*.
[100] Ethereum, *Web2 vs Web3.*

3.2.3 Ethereum

Ethereum is a public permissionless blockchain, which relies on the Ethereum Virtual Machine (EVM). It is built and maintained by its community and has its own crypto currency, the native token Ether (ETH).[101] A native token is basically the inherent digital crypto currency of a specific blockchain. Ethereum is the single most important blockchain in the development of web 3.0 applications – dApps.[102] Its great potential lies partly in its open and decentralized nature, which lets anyone read and interact with the Ethereum protocol. No single unit (for example a firm) controls the chain, and anyone can interact with the immense number of applications powered by the Ethereum blockchain.[103] Thanks to the chain being *programmable* – as opposed to for example Bitcoin – and *Turing-complete* one can program or write almost anything on it and not only crypto currency transactions.[104]

Above, we presented the concept of tokenization in the blockchain environment. Token systems through smart contracts are very simple to implement in the Ethereum blockchain and they can represent different kinds of value. It is good to get a picture of the variety before moving further into the analysis and translation of the framework.[105]

3.2.4 Platform

In this thesis, the platform is a foundational element. The concept of the platform is described below, both from a Web 2.0 and a Web 3.0 perspective.

3.2.4.1 Platform on Web 2.0

The framework presented by Parker et al. in Platform Revolution is based on insights found by the authors when working to understand the speedy rise of the platform as a model for organization and business.[106] In this context, a platform is "a business based on enabling value-creating interactions between external producers and consumers." As shown in Figure 2, the platform is placed in the middle of a transaction and does not buy nor sell the service which is provided. Instead, it enables the buyers and sellers to find each other and works to facilitate the interactions between them using guiding technical solutions and governance conditions.[107]

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[101] Ethereum, *What Is Ethereum?* (04/06/2022) https://ethereum.org/en/what-is-ethereum/.
[102] As of today, the phrase Web 3.0 basically means "built on Ethereum". Denning, Tim, *Here's How to Write on a Web 3.0 Platform*, 19/07/2021, (18/05/2022) https://timdenning.com/heres-how-to-write-on-a-web-3-0-platform/.
[103] Ethereum, *What Is Ethereum?*
[104] Ethereum, *Web2 vs Web3* and *What Is Ethereum?*
[105] Ethereum, *Introduction to Dapps.*
[106] Parker et al., *Platform Revolution*, Preface.
[107] The definition which is used in Platform Revolution, Parker et al., *Platform Revolution*, p. 5.

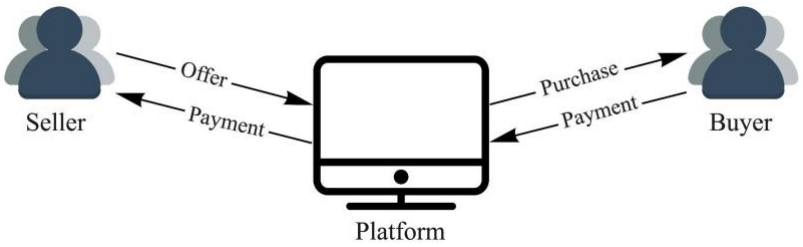

Figure 2: An interaction between two users on a platform. In this example, the interaction is a transaction of some kind. One user is a seller who offers value and receives payment, the other is a buyer who takes part of the value in exchange for payment. To make it more concrete, the seller can be an Uber driver, the offered value a ride and the buyer a rider.

Another definition of platform used by Parker et al. is "an infrastructure designed to facilitate interactions among producers and consumers of value."[108] An important added aspect in this definition is the act of facilitation. The platform cannot only exist in the middle but needs to facilitate the interactions or the users would not need the platform at all.

3.2.4.2 DApp on Web 3.0

"DApp" is short for *decentralized application.* A dApp is a client-side single-page application built on a blockchain, such as Ethereum.[109] The dApp is decentralized compared to other conventional applications since it has its backend code running by smart contracts on a peer-to-peer network while conventional applications usually have centralized or centrally owned servers to run them.[110] For a crypto project, such as an dApp, to gain legitimacy there is often a published *white paper* produced by a community. The white paper is a public statement that formulates and describes for example the idea and vision of the dApp, governing mechanisms, key technological aspects and functions, as well as tokens used on the dApp.[111]

The frontend code of the dApp and its user interface can be written in any programming language and be hosted on any decentralized storage solution, such as IPFS.[112] The Ethereum blockchain works as a foundation for building dApps, which are governed individually by their own rules and having their own transaction formats, such as tokens. Hence, the default decentralized layer of the dApp is the foundational layer, L1 – the blockchain. The dApp itself can be governed in whatever fashion the dApp creator wishes.

[108] Parker et al., *Platform Revolution*, p. 134.
[109] Palladino, S. *Ethereum for Web Developers*, p. 9.
[110] Ethereum, *Introduction to Dapps*; Bartel, G., *What is a Dapp? A Guide to Ethereum Dapps*, FreeCodeCamp, 13/05/2020 (12/06/2022) https://www.freecodecamp.org/news/what-is-a-dapp-a-guide-to-ethereum-dapps/ and Palladino, S. *Ethereum for Web Developers*, p. 9.
[111] BitcoinWiki, *White Paper* (12/06/2022) https://en.bitcoinwiki.org/wiki/White_Paper.
[112] Ethereum, *Introduction to Dapps*; IPFS (18/05/2022) https://ipfs.io/ and Palladino, S. *Ethereum for Web Developers*, p. 9.

However, to interact on the dApp, the user or client transact value by the use of smart contracts on blockchain, that also set the rules for the interactions.[113] Since the smart contracts on Ethereum functions as APIs, one can also include smart contracts created by others in the developed dApp.[114] If one wants users to be able to swap tokens across dApps for example, the developer can just reuse the smart contracts used for interactions on other dApps.[115]

DApps can be fully decentralized by using decentralized storing spaces, only using data lying on the blockchain and using smart contracts to design all interactions that take place through the application. In this way, the dApp needs to navigate between several decentralized parts of the ecosystem. It should also be noted that no single entity can prevent any user from participating on the dApp, due to the blockchain being both public and permissionless.[116] Distribution and decentralization also adds to the stability of the dApp, since the dApp smart contract or code cannot be taken down or altered once published.[117]

Something should also be said about the general pros and cons of dApps, as presented on the Ethereum developers' site.[118] If we start with the positive aspects, the running on blockchain, which is distributed and decentralized, means *zero downtime*. The network helps running the dApp/smart contracts even though one of the nodes would fail, which also means users will be able to continue to interact. This also increases security. Since all user id data can be anonymized and is not needed for the interactions to be validated, the technology provides *privacy*. The dApp is generally *resilient to censorship*, due to the lack of a central governing entity proclaiming the conditions for usage and creation. Single users can as a main rule not be blocked from accessing or interacting on the dApp.[119] Complete *data integrity* is secured by means of the blockchains immutability. Once data is public, it is extremely difficult to manipulate or damage in any way. Finally, there is the *trustless computation* or *verifiable behavior* provided by smart contracts. Smart contracts are usually analyzed before they are deployed and are predictable by nature. No central authority is needed,[120] which limits the risks that follow with the involvement of an extra actor.[121]

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[113] Palladino, S. *Ethereum for Web Developers*, p. 9.
[114] Ethereum Whitepaper, Vitalik Buterin, 2014 (29/05/2022) https://ethereum.org/en/whitepaper/ and Ethereum, *Introduction to Dapps.*
[115] Ethereum, *Introduction to Dapps.*
[116] Palladino, S. *Ethereum for Web Developers*, p. 10–11.
[117] Ethereum, *What Is Ethereum?* and Palladino, S. *Ethereum for Web Developers*, p. 10–11.
[118] Ethereum, *Introduction to Dapps.*
[119] This depends on the level of decentralization – see section just above.
[120] Even though one can question who gets to assess the reliability and trustworthiness of the smart contract to begin with.
[121] See for example Finematics, *CODE IS LAW? Smart Contracts Explained*, YouTube, 13/06/2020 (25/05/2022) https://www.youtube.com/watch?v=pWGLtjG-F5c.

The drawbacks of the dApps are several. *Maintenance* is more difficult since the code is on the decentralized blockchain network, and it is a complex maneuver to modify it to enable dApp updates and bug fixes once the dApp is up and running. The Ethereum community struggles with extreme *performance overhead* making it difficult to scale, due to the capacity required to make every validation. *Network congestion* is another effect of the validation process. There is a limit to how many transactions can be performed by the network at the same time, and if a dApp requires too much computational space to run its interactions it will "clog" other interactions. The *user experience* is something that we get back to further on in the thesis, but this is obviously something that will need to be managed for the purposes of web 3.0 adaption. This is about the user struggling to understand what is needed to set up the "starter pack" for safe interaction with the web 3.0 sphere. Lastly, *centralization* is ironically one of the hurdles for dApps and their developers. Even though the dApps run on the decentralized network of for example Ethereum, centralized elements such as servers used for storage might be needed for the user- and developer-friendliness. Ethereum argues that the limitation of decentralizing factors by adding centralized ones eliminates many of the advantages of blockchain, the developer Santiago Palladino proposes that centralizing might be a way to solve the slowness caused by decentralization,[122] and maybe it can help congestion and performance overhead. This will be further discussed under the Section 5.5 *Governance*.

3.2.5 DAO

A DAO, short for *Decentralized Autonomous Organization*, can be considered a blockchain governing mechanism. It is a virtual community led entity or organization on the chain that has no central authority, and where members act like shareholders of tokens.[123] The members of the DAO use tokens to make proposals and vote according to pre-set majority rules about modifications in the code, the allocation of value or how and where to raise funds.[124] Fundraising can be done through the issuance of tokens. The governance by the DAO is completely transparent since smart contracts govern the foundational voting rules and execute decisions. The decision-making process can be audited by anyone at any time on a public blockchain.[125]

[122] Palladino, S. *Ethereum for Web Developers*, p. 10–11.
[123] Shuttleworth, D., *What Is A DAO And How Do They Work?*, Consensys Blog, 07/10/2021 (12/06/2022) https://consensys.net/blog/blockchain-explained/what-is-a-dao-and-how-do-they-work/; Ethereum, *Decentralized autonomous organizations (DAOs)* (12/06/2022) https://ethereum.org/en/dao/ and Ethereum Whitepaper.
[124] Ethereum Whitepaper and Shuttleworth, *What Is A DAO And How Do They Work?*.
[125] Shuttleworth, *What Is A DAO And How Do They Work?*.

According to Vitalik Buterin in the Ethereum white paper the allocation of DAOs funds can regard salaries, as well as local or internal currency and reward mechanisms, and he makes the comparison to the governance of a regular company or organization, in which powers are distributed by the holding of shares.[126] However, the DAO itself is not hierarchical. A member of a DAO simply chooses how involved to be in it, either by tokenization or by level of participation or presence. By tokenization, a member can choose to swap tokens into governance and voting right tokens.[127]

3.2.6 Success

A term which does not have one clear definition is success. As the aim of this thesis is to create a framework of what to consider when creating a web 3.0 application, the concept of success is constantly present and needs to be properly defined. Merriam-Webster defines it as a "degree or measure of succeeding" or "favorable or desired outcome"[128] but such a definition only takes us part of the way. It is easy to see that success for one actor is not necessarily the same as success for another. Instead, it heavily depends on several aspects, such as what perspective is taken, why the platform or application was created, and what aims they have. As the thesis finds its basis in the web 2.0 focused Platform Revolution Framework, we have defined what is considered "success" for a web 2.0 platform mainly based on that. There are, to some extent, different interests at play on web 3.0. The concept of success on web 3.0 dApp is therefore not identical with the web 2.0 version and is defined separately.

3.2.6.1 Success on Web 2.0

The concept of success is not clearly defined in Platform Revolution. However, they do mention that the platform business model underlies the success of a lot of the most prominent actors' size, speed of growth and disruptive nature.[129] Also, there are extensive examples in which Parker et al. express that companies have succeeded. These have been used as a basis to construct their view of success on web 2.0 as a concept. Note however that this definition will not include all aspects, but rather the most obvious and important ones, which make a Web 2.0 platform successful according to Parker et al.

First and foremost, the facilitation factors for interactions on a platform are important for the success of web 2.0 platforms. They are connected to the network effects, which are

[126] The white paper brings up the "capitalist" model of a DAO ("decentralized autonomous corporation") along with the alternative of the "decentralized autonomous community".
[127] Shuttleworth, *What Is A DAO And How Do They Work?*.
[128] Merriam Webster, Dictionary, *Success* (18/05/2022) https://www.merriam-webster.com/dictionary/success.
[129] Parker et al., *Platform Revolution*, Preface.

discussed further under Sections 5.1 *Network Effects* and 5.7 *Metrics*. The same goes for the degree of openness, which is discussed further in Section 5.2 *Openness*.

Disruption is a factor of high interest for Parker et al. Describing the effect Airbnb has on the hospitality market and Uber on the mobility market, they present the ability to make space for yourself by turning a market on its end as one of the platform business model's key tools. The concept of disruptive innovation was developed in 1995 and describes innovation of two kinds: 1) entering the market "from below" for example with a cheaper, niched product to establish the product on the market and later "move upwards" and displace the market-leaders; or 2) create a new value network and market around an existing product.[130]

What enables platforms to disrupt markets? One major enabler is that they do not operate as pipelines, using the internet only for distribution purposes. Instead, they leverage opportunities created by the technology to enhance their business models, both in terms of development of the infrastructure and as a means of coordination. By doing this, platforms have two major economic advantages over traditional pipeline businesses: better margins on both production and distribution as well as the ability to leverage network effects to scale very quickly. Using the internet to coordinate and facilitate interactions between users who want to share their resources instead of owning the resources internally has been shown to remove a lot of limitations and increase the scalability of the business. Platforms are also finding ways to *modify the value creation* continuously. By doing so they can make use of new supply sources which enables more value creation to be made. An example of this is how Uber offers financial compensation, such as bonuses for signing up to the service, to lower the economic barriers which might hinder potential drivers or riders from using it. Platforms are also known for *enabling new types of consumer behavior* by changing how the value is consumed. Airbnb making it possible for people to host strangers in their homes is a good example of this. Finally, creating the possibility of *community-driven curation* has enabled the platforms to make use of its network to create quality in their service.[131]

Platforms have also been disruptive to the *structure of the business landscape* in several ways. The most obvious example is the de-linking of the value which is created by a physical asset from its owner. This creates a possibility of putting assets to better use instead of having them laying around when the owner is not using them. This increases efficiency and creates opportunities of extracting value.[132] Again, Airbnb makes a good example - as they enable the

[130] Clayton Christensen Institute, *Disruptive Innovations*, Clayton Christensen Institute (06/05/2022) https://www.christenseninstitute.org/disruptive-innovations/.
[131] Parker et al., *Platform Revolution*, p. 64-68.
[132] Parker et al., *Platform Revolution*, pp. 69–70.

use of spare housing and guest rooms which would otherwise be sitting empty.[133] Another way in which platforms have disrupted the business landscape structure is that it has, despite the initial predictions in the dawn of the Internet, created more and new kinds of middlemen in the transactions. Parker et al. calls this the *re-intermediation* and explains how these types of intermediaries depend on software and algorithms instead of manual efforts. This makes them more scalable and efficient. If data is collected and utilized properly, such intermediaries will also become better and better. For the participants on a platform, this means more power and efficiency than before. It changes the landscape by creating new winners and losers.[134]

Lastly, there is the bonus of *market aggregation*. Platforms enable the organization of markets which were previously unorganized, by providing centralized markets. An example of this is the Amazon Marketplace, which provides a platform for thousands of online vendors around the world. This makes it easier and quicker for consumers to find what they want and compare alternatives, and it increases the reach of the vendors to more potential customers.[135]

The effect the disruptive platforms have on the *everyday life of people*, and the fact that it is big, also seems to be considered when measuring success. The platforms are "transforming the lives of individuals in ways that would have been impossible a few years ago."[136] Parker et al. illustrate a future where most professions will be affected by platform revolutions and how many opportunities, and challenges, will arise. Examples are given of users making money by creating classes on Skillshare, writers building an interest for their work through story sharing platforms, and career changes being made because of content created on Reddit.[137] To summarize, a successful platform can have disruptive effects on both markets and lives.

Another aspect which is needed for a web 2.0 platform's success is *scaling*. Traditional businesses act as a pipeline, employing a step-by-step process for value creation with producers in the beginning and the customers in the end. Pipeline businesses need gatekeepers to manage the value flow. For a publishing business, an editor choosing a few books, the ones they think will be successful, from the thousands that have been submitted is the gatekeeper. Lately, businesses are leaving the pipeline process behind in favor of a platform-like structure. This structure is much more complex, with producers and consumers continuously entering different relationships with each other and the platform. Users of a platform can easily be both producers and consumers, sometimes even having both roles at the same time. This means that value can

[133] Airbnb has also had a different effect as people have started purchasing apartments only to rent them out on the platform.
[134] Parker et al., *Platform Revolution*, pp. 71–72.
[135] Parker et al., *Platform Revolution*, pp. 72–73
[136] Parker et al., *Platform Revolution*, p. 4.
[137] Ibid.

be created in many different places and ways simultaneously, instead of flowing in one straight line. This in itself facilitates the creation of value, and therefore the scaling of the business. Platforms can also scale easier than pipelines as there is no need for gatekeepers to curate the content. Instead, they can use the market signals provided by all of the users in the platform's community and see quite quickly what is successful and what is not with little effort.[138] This kind of scaling enables economic growth as it increases the number of interactions with the platform.

Finally, an important key to the success of a platform is the ability *to find and create new sources of value*. Airbnb makes an excellent example as the first hotel business which does not own or rent any property. Instead, they use the platform business model to allow users to provide and rent rooms from each other and monetize by taking a fee from each transaction made on the platform. They exposed the hospitality market to new supply and completely changed its competitive landscape, very quickly taking an increasing share of the market.

As mentioned, this definition of success is based on how we understood Parker et al. That said, and quite unsurprisingly, nothing in this definition differs from a general view on successful companies on a market. In summary, success of a web 2.0 platform is embodied in the ability to:

- disrupt markets;
- scale to increase the market and the market shares held by the platform;
- innovate and find new types of value creation; and
- transform the lives of the users.

Looking at it from this perspective, the web 2.0 platforms are like most companies when it comes to the definition of success – driven by the aim of growth to achieve increased earnings and fulfill the interests of the shareholders while producing a high-quality product or service for the customers or users.

3.2.6.2 Success on Web 3.0

As web 3.0 is much newer than web 2.0, with a lot fewer established actors, it is easy to get stuck in the values behind the creation of blockchain technology as a measurement of success. If that is the case, successful dApps should be completely decentralized, on all layers and in all aspects, not allowing any central point of authority to have any type of control. Instead, all types

[138] Parker et al., *Platform Revolution*, pp. 6–7.

of governance of each dApp should be performed by the communities acting on it. Furthermore, the dApps should enable users to access more of the value they create, only taking part of the created value to the extent it is needed to finance the maintenance and development of the dApp.

We do not believe that this is always the case. Actors with well-known commercial interests, such as Twitter or Meta, are already starting to offer services on web 3.0. They are riding the hype wave and using web 3.0 technology, not for the functionalities it enables, but to entice and attract users.[139] As has been discussed, key characteristics such as decentralization have to be part of all of the layers of a dApp for it to be truly decentralized. That means it would be easy for Meta to create a centralized application and deploy it on a blockchain. This might give users the impression that the application is decentralized and prevent them from realizing they are still in the hands of Meta.

Looking at an average case, we believe that most are somewhere in the middle. A lot of dApps are being created with the spirit of web 3.0 in mind, but also with some kind of will to create a functioning business. Many do seem to want to give more of the value to the users, instead of keeping it for themselves, and seem to find value in being able to offer existing services on better terms to the users.[140] We believe this does not have to mean that they do not have any interest in making money at all. It does however mean that they will not turn into tech giants as easily as their web 2.0 equivalents were able to. Even if many transactions are being made on a dApp, the power will be distributed to the community as long as it is decentralized.

One similarity between success on web 2.0 and web 3.0 is the aim to *disrupt*. As many dApps aim to replace existing services, either by offering more of the created value to the users or by offering a new value in the shape of tokens. There is a chance they will be able to recruit users from the web 2.0 platforms and disrupt the existing market landscapes. Another similarity is how many dApps claim to want to transform the lives of the users. Instead of focusing on offering a new service, they want to enable users to take part in the value they create. In our view, if the users manage to monetize interactions they are already having, this can transform the lives of the users to at least the same extent as the creation of a web 2.0 platform.

As will be discussed, creating a token which becomes established and valuable can be another measure of success for a dApp. For a token to be considered established and valuable, it should be transacted continuously or exist in a very limited amount.[141]

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[139] Allyn, B., *People are talking about Web3. Is it the Internet of the future or just a buzzword?*, All Things Considered, NPR, 21/11/2021 (12/06/2022) https://www.npr.org/2021/11/21/1056988346/web3-internet-jargon-or-future-vision?t=1655067194027.
[140] This is the case for all of the sample dApps.
[141] Shuttleworth, *What Is A DAO And How Do They Work?*.

From a technical point of view, success for a blockchain on L1 comes from use, in other words – a high number of continuously occurring transactions. The more transactions are being made on a blockchain, the more stable and trustable it becomes. This is because a larger network offers more confirmation of transactions and more alternatives when it comes to consensus mechanisms. It also enables the blockchain to be more distributed and decentralized.

4 Sample DApps

In this section, the four chosen dApps (the sample dApps) are presented briefly.

4.1 Airbnb: Dtravel – "The Next Evolution Of Home Sharing"

Dtravel is a dApp consisting of a decentralized and community owned home sharing network equivalent to the web 2.0 platform Airbnb.[142] It markets itself by arguing for its lower fees of 5–10 % per booking, compared to "other home sharing companies" (Airbnb) who charge 20 %.[143] It is built on BNB Smart Chain (previously Binance Smart Chain) which is compatible with the Ethereum Virtual Machine and is governed by a DAO consisting of hosts and guests using Dtravel, as well as other holders of the TRVL tokens. Dtravel is currently developing its governance structure, but it will have a Dtravel DAO Representative Council consisting of members chosen by token holders and later the DAO will open up. The participants in the dApp are hosts, guests, contributors (developers) and a core team.[144] It has its own token called TRVL with the four purposes of *travel*, *loyalty*, *protection*, and *governance*.[145] The TRVL token furthermore enables the users to book stays, earn rewards, vote on proposals, exchange it for benefits and access loyalty programs. It also has a Premium NFT which is a form of loyalty program giving benefits such as free flights, hotel stays and cashbacks.[146]

The dApp is not yet released, but hosts can sign up on the waitlist and the white paper holds a roadmap where one can follow the evolution of the dApp.[147] An interesting aspect is, that the Core Developers of Dtravel, who will also be the ones to vote for members to the Representative Council, are former executives from for example Airbnb and Expedia. Some of the investors in the project are also former executives from Airbnb, Expedia, Google, and Uber.[148]

[142] Dtravel Whitepaper, Jan 2022 (04/06/2022) https://whitepaper.dtravel.com/.
[143] Dtravel Whitepaper.
[144] Dtravel Whitepaper, https://whitepaper.dtravel.com/whitepaper-1/the-dtravel-solution.
[145] Dtravel Whitepaper.
[146] Dtravel Whitepaper.
[147] Dtravel Whitepaper.
[148] Dtravel Whitepaper.

4.2 Uber: Drife – "Taxi 3.0 | Ride-hailing Reimagined"

Drife is a decentralized ride-hailing dApp resembling the web 2.0 platform Uber. The dApp's purpose, except for ride sharing, is the empowerment of the participants who create the value on the dApp through interaction, which Drife argues is captured by the governing central unit on web 2.0 platforms .[149] Furthermore, it aims to solve the problems of unfair pricing, lack of transparency and freedom, closed governance and lack of loyalty to the platform by contributing to a more efficient, transparent and fair ride-sharing economy.[150] Drife is built on BNB Smart Chain[151] which is EVM compatible. The dApp has its own token – DRF. Both drivers and riders are incentivized to perform actions on the dApp by the possibility of earning tokens. There is also an NFT called FNFT for franchise owners.[152] From what we can tell, these franchise owners will operate as DAOs and establish the ride-sharing service locally.

Drife charges participants per subscription basis instead of per ride, providing a zero-commission model. This is partly facilitated by the fact that the gas fee is being removed from the transaction by means of meta-transactions through the tool Biconomy.[153] The drivers can independently set their prices and the riders can choose drivers based on rating, equipment, price, etc.[154]

4.3 YouTube: DTube – "Turning the Tables in the Social Media Industry"

DTube is a decentralized dApp for video sharing, similar to the web 2.0 platform YouTube. It claims to be un-censorable and advocates transparency, collaboration and privacy.[155] DTube runs on the Avalon blockchain, which is connected to the Enterprise Ethereum Alliance,[156] and is compatible with Ethereum.[157] The dApp is driven and developed by the community and there

[149] Drife Whitepaper, *Taxi 3.0 Ride-hailing Reimagined*, 2021 (04/06/2022) https://whitepaper.drife.io/.
[150] Drife Whitepaper.
[151] Some sources claim that it is built on Aeternity, but we find this most reliable.
[152] Drife Whitepaper.
[153] Unlock Media, *Drife Blockchain ride sharing platform partners with Biconomy*, 19/10/2021 (12/06/2022) https://www.unlock-bc.com/81261/drife-blockchain-ride-sharing-platform-partners-with-biconomy/ and Biconomy, Go Gasless (12/06/2022) https://www.biconomy.io/gasless-page.
[154] Drife homepage, https://www.drife.io/.
[155] DTube White Paper, *Turning the Tables in the Social Media Industry: A New Model Where Users Vote On Videos to Reward All Contributors*, June 2019 (04/06/2022) https://token.d.tube/whitepaper.pdf.
[156] Hyperledger Foundation, *Hyperledger Avalon* (12/06/2022) https://www.hyperledger.org/use/avalon.
[157] "Hyperledger Avalon: a ledger independent implementation of the Trusted Compute Specifications published by the Enterprise Ethereum Alliance." Hall, M., *Hyperledger and ConsenSys Collaborate on Ethereum Webcast Series*, Consensys Blog, 03/03/2021 (12/06/2022) https://consensys.net/blog/events-and-conferences/hyperledger-consensys-ethereum-webcast-series/ and Hyperledger Avalon, *Hyperledger Avalon 0.5.0.dev1*, avalon_sdk.connector.blockchains.ethereum.ethereum_wrapper.EthereumWrapper Class Reference (12/06/2022) https://hyperledger.github.io/avalon/classavalon__sdk_1_1connector_1_1blockchains_1_1ethereum_1_1ethereum__wrapper_1_1EthereumWrapper.html.

are several DAOs for certain purposes, such as translation, moderation, curation and design.[158] DTube has its own token called DTUBE coin (DTC), which can be used to gain voting power and to reward producers on the dApp. The reward is shared among the dApp users, due to the *Avalon reward distribution mechanism*.[159] The tokens also work as curation mechanisms since voting sends the content further up in the feed.[160]

DTube was launched in 2017 on the Steem blockchain, before it moved to the Avalon chain in 2019.[161] Users can create a free account directly on DTube or use their Hive or Steem account and the dApp still generates Steem coins.

4.4 Facebook: Minds – "Elevate the global conversation"

Minds is a social media network dApp resembling the web 2.0 platforms Facebook and Twitter. It claims to provide organic reach, privacy, and monetization opportunities for participants.[162] It first launched on web 2.0 in 2017 but was transferred to the Ethereum blockchain in 2018 and at the same time, the original point system was translated into the token MINDS (ERC-20).[163] The token can be used to buy advertising space, to send tokens to other users for liking their content or to become premium members (Minds and Minds Pro), to reward contributions to the space and to measure reputation.[164]

The Minds dApp advocates free speech, privacy, openness, self-sovereignty, and community governance. However, the free-speech advocacy has apparently made the platform attractive to users with "opinions that border on the edges of current cultural norms".[165] Even though the goal is decentralization, Minds has launched a DAO which will open the government structure further in the future, based on the assessments of the DAO. It has also launched a community-based jury-system, to review appeals on content moderation decisions.[166]

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[158] DTube White Paper.
[159] DTube White Paper.
[160] See more about how the curation and reward system works at DTube Wiki (04/06/2022) https://d.tube/#!/wiki/faq/how-does-token-economy-works and in DTube White Paper.
[161] DTube White Paper.
[162] Minds Whitepaper, *The Minds Token*, v2, 03/09/2021 (04/06/2022) https://cdn-assets.minds.com/front/dist/browser/en/assets/documents/Minds-Whitepaper-v2.pdf.
[163] Minds Whitepaper, v2.
[164] Minds Whitepaper, v2.
[165] See for example discussion started by u/broaway831, *I looked into it - Toe isn't trying to take down this sub*, Reddit, April 2022 (12/06/2022) https://www.reddit.com/r/thefighterandthekid/comments/u1fbrx/i_looked_into_it_toe_isnt_trying_to_take_down/ and Guevara, W., *I Tried the Alternative Social Media App 'Minds' So You Don't Have To*, The Startup, Medium, 13/01/2021 (12/06/2022) https://medium.com/swlh/i-tried-the-alternative-social-media-app-minds-so-you-don-t-have-to-b2a367f0291a.
[166] Minds Whitepaper, v2.

5 Platform Revolution Framework Adaptation

In this section, the models from the Platform Revolution framework are presented and discussed. Each sub-chapter includes a presentation of how a model is described by Parker et al., an analysis of how the blockchain theory affects the model with inserted examples from the sample dApps, and a conclusion of if and how the model needs to be adapted for web 3.0.

5.1 Network Effects: A Phenomena with a Life of its Own

There are two main ways for a company to be profitable, either it needs to have low production costs or offer high value to the customers. A basic economic theory, which relates to the first alternative, is *supply economies of scale*. It describes how industrial companies are able to take advantage of production efficiencies, as the cost per unit produced decreases in correlation with an increase of the produced quantities. It is called supply economies of scale because the positive effects grow together with the supply. *Demand economies of scale* instead relate to the offering of higher value. Making use of technological developments on the demand side to offer services which further encourage the interactivity by users, it is the foundational logic behind the existence of *network effects*. As the users are more active on a platform, the value created for the platform increases as well.[167]

5.1.1 Presentation of Theory in Relation to Web 2.0

In the Platform Revolution framework, the model called network effects shows a foundational characteristic of the platform business model: the number of users operating on the platform affects the value created for each user. This is one of several aspects, other examples being price effects and brand effects, which build markets.[168] Network effects can be split into two categories: positive and negative. *Positive network effects* refer to the ability of a community operating on a platform to create value for each active user. For a platform business, these effects make up an important source of competitive advantage and value creation. To enable the positive network effects, the community needs to be quite large, and it also has to be well-managed by the platform. *Negative network effects* refer to the risk that an increasing size of a community, if not managed well, can reduce the value for each active user.[169]

[167] Parker et al., *Platform Revolution*, pp. 18–19.
[168] Parker et al., *Platform Revolution*, p. 22.
[169] Parker et al., *Platform Revolution*, pp. 17–18.

5.1.1.1 Two-sided platforms

Many of the platforms are *two-sided*, which means that users' actions on the platforms can be split into two groups (such as buyers and sellers). These two user groups can sometimes be treated as two different markets, and losses in one market can be accepted as long as they are smaller than the profits in the other market.[170]

On the two-sided platforms, the network effects can be split into two other categories: same-side effects and cross-side effects. The *same-side effects* are the effects which occur within the same user group, or in other words on the same side of the platform. The *cross-side effects* on the other hand, are caused by the increase of users on one side of the platform and create value for the users on the other side of the platform.[171] The difference between the two is illustrated in the figure below.

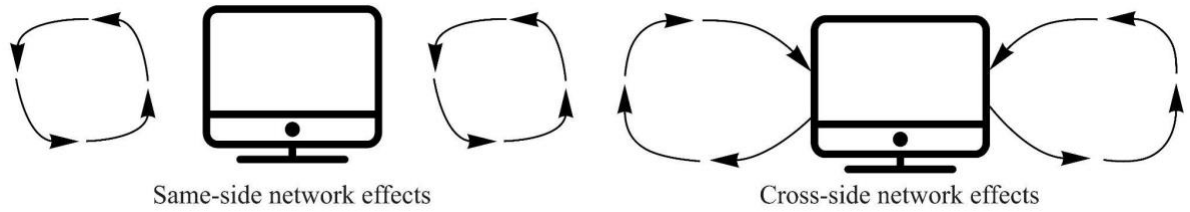

Figure 3: Showing same-side effects which have their cause and effect happening on the same side of the platform, and the cross-side effects where the cause is found on one side and the effect on the value on the other side.

Both the same-side and cross-side network effects can be combined with the other category and be both positive and negative. This means that there are four categories altogether:

- Positive same-side network effects;
- Negative same-side network effects;
- Positive cross-side network effects; and
- Negative cross-side network effects.

5.1.1.2 Scaling a Platform – Frictionless Entry and Side Switching

As positive network effects are something to strive towards, and as they increase with the size of a well-managed network, it is important to attract and retain users to effectively scale a platform. There are several scalability tools which can be used to enable such development. One main tool is to allow for *frictionless entry* - to make it quick and easy for a user to join and start taking part in the value creation on a platform. Another is to allow *side switching*, which

[170] Parker et al., *Platform Revolution*, p. 21.
[171] Parker et al., *Platform Revolution*, p. 29.

is when users can easily participate on both sides of a platform. An example of this is when a producer of a service, such as an Uber driver, also can be a consumer, a rider.[172]

5.1.1.3 Limiting Negative Network Effects

As the platform scales, it is also important to limit the negative network effects. This can be done through effective *curation*, steering users towards quality content and services which they will appreciate. This is important as the increase in content makes it more difficult to find the best match for the users themselves. It is also possible to limit who can join and stay on the platform based on *policies* of appropriate behavior.

The larger the network becomes, the more data there is to base the curation on, which in turn will make the curation more accurate. This circular phenomenon is called *data driven network effects*.[173]

5.1.1.4 Managing Externalities

A key differentiating factor between a traditional firm and a platform is that the platform does not hold most of the value in internal functions, such as production or in-house R&D. It has a limited amount of people employed, and therefore limited internal capabilities, in relation to the crowds they intend to reach. Instead, there are *externalities*, such as open innovation networks and user crowds in which the mass of the value creation happens. This means that platforms can have much more use of network effects externally, as they are far easier to scale. It is of utmost importance to have the skills and capabilities needed to manage such externalities to the benefit of the firm, and to work with functional, instead of vertical and horizontal, integration as well as network orchestration.[174]

5.1.2 Analysis of Applicability on Web 3.0

The tricky part with web 3.0 is its multi-layered and technology dependent nature, where the network effects on one layer affects the other layers. For example, network effects occurring on L1 and L2 affect the L0 as an increase in token transactions makes the token more valuable, which in turn incentivizes the nodes to (correctly) validate transactions.[175] This increases the level of immutability and trust on the blockchain. We will not dig deeper into the multi-layered

[172] Parker et al., *Platform Revolution*, pp. 24–26.
[173] Parker et al., *Platform Revolution*, pp. 26–28.
[174] Parker et al., *Platform Revolution*, pp. 32–33.
[175] Singh, Samer, *Crypto & NFTs: Network Effects in Web3*, Medium, 22/11/2021 (24/05/2022) https://breadcrumb.vc/crypto-nfts-network-effects-in-web3-7689cf8f0439.

network effects of blockchain at this stage but focus on the network effects on L2 which are interesting enough.

When it comes to the *positive* and *negative network effects*, a lot of the reasoning is the same or similar on web 3.0 dApps as on platforms. Since it relates to the number of interactions created by users, we do not yet see how this would differ. We do however want to point out that as network effects are a phenomenon which to some extent has "its own life" it is difficult to predict how it will play out in the blockchain environment. One aspect which we predict will still be important is the management of users. Since properly managing the users is one way of pushing the network effects towards being positive, this must be part of the strategy of a dApp as well. It might, which will be discussed in the model Governance, be more complicated in the web 3.0 environment.

5.1.2.1 Two-sided, Multi-sided or At-all-sided?

As we have seen, network effects can be either *same-sided* or *cross-sided*. This requires a central unit or border defining the two (or more) sides. On web 2.0 this would be the platform itself, like the Uber app having a driver side and a rider side. Since blockchain is peer-to-peer the concept of sides of the network are somewhat blurred. Even though there are dApps with equivalent sides as the ones on web 2.0 – for example Drife still divides its users into drivers and riders (and franchisers) – most users of web 3.0 platforms are able to choose whether or not to have sides. This is allowed partly by the peer-to-peer and permissionless blockchain, where everyone can write or do anything without the involvement of an intermediary party. In other words, neither the dApp nor any other third party is needed for an interaction to take place, since the transaction happens on L0 and L1 through smart contracts.

5.1.2.2 User Attraction to Scale – Frictionless Entry

When it comes to the *attraction* of users, there are some apparent differences between platforms and dApps. Enabling *frictionless entry* is more difficult in some respects. Blockchain technology is considered difficult and represents something scary and complex to many people which they would rather avoid. This risks keeping potential users away from the dApps simply because they exist in that environment.[176] To engage with a dApp there is also often a need to have a crypto wallet which allows for interaction with a user's tokens. In other words, users

[176] Singh, S., *Crypto & NFTs: Network Effects in Web3*, Medium, 22/11/2021 (24/05/2022) https://breadcrumb.vc/crypto-nfts-network-effects-in-web3-7689cf8f0439.

who do not yet have a wallet will have to create one before being able to interact on the dApp.[177] This connects to interesting considerations on decentralization versus user friendliness, which will be further elaborated on in the model Governance.

On that note, the tokenization system and rewards tend to sometimes be complicated and difficult to understand. The tokenization system of Minds is an example of this, as the users get a different amount of tokens as rewards for their content depending on how much activity there has been on the dApp the day it was published.[178] This can make it so that something which otherwise would be an incentive to join a dApp, instead creates extra friction. Also, there is no centralized marketplace for dApps which everyone uses, comparable to the iOS App Store or Android Market.[179] This puts higher demands on users who will have to know where and how to look in order to find the dApps, but also on the dApp management which needs to ensure visibility and a presence on all relevant marketplaces.

All of these aspects create more friction for users wanting to start using a dApp. However, as the technology is transparent and permissionless the dApps can choose to make it easy for anyone to join or develop for them, provided that the participant has the required knowledge. Also, as discussed in the model Monetization it is important to balance the friction with the value provided to the users. If a higher value is offered, for example through the use of tokens, higher friction might be tolerated by the users.

The ease of s*ide-switching* on a dApp depends on how it decides to position itself in the network. As was mentioned, the ride sharing dApp Drife has created two applications, one for riders and one for drivers. This makes it more difficult for users to switch between the categories which risks lowering the attraction of users and interactions in each user group. If a dApp instead chooses to position itself less centrally in the network, there are no sides to speak of and therefore the side-switching is not needed to be facilitated in the same way.

5.1.2.3 Limiting Negative Network Effects to Retain Users

Regarding retaining users, dApps will, similarly to platforms, have to perform some kind of *curation* to encourage high-quality content and limit the negative network effects. Depending on how the dApp is structured, this might be difficult since curation needs a central actor making decisions on what to encourage. A lot of dApps also make a point to avoid "butting in", wanting

[177] Wenger, A., *Web3: Wallets Needed*, 31/01/2022 (12/06/2022) https://continuations.com/post/674904834890203136/web3-wallets-needed. The Ethereum one(two)-liner speaks for itself: "Ethereum is open to everyone. All you need is a wallet to take part." Ethereum, *What Is Ethereum?*.
[178] Minds Whitepaper, v2.
[179] Singh, S., *Crypto & NFTs: Network Effects in Web3.*

to keep their network less centrally controlled in contrast to available web 2.0 platform counterparts. A good example of this is the social media dApp Minds, which aims to "bring the Internet freedom back to social media".[180] While limiting the moderation and censorship, they focus on enabling privacy and anonymity. Unfortunately, this has created an environment where a lot of extremist thoughts and ideas are expressed and Minds has been criticized for not moderating its content.[181] As the network grew, they had to adapt. To compromise, a decentralized jury system was created and put in charge of the moderation.[182] To summarize, as low levels of curation might lead to negative network effects, a balance will need to be found.

Another way to ensure user retention is to govern their participation through *terms of use*. This is also more complex without a central actor but will be discussed further in the model Governance.

5.1.2.4 The Concept of Externalities in the Web 3.0 Environment

The importance of managing externalities is exceptionally interesting in the web 3.0 sphere. The limits of what should be considered externalities are blurred, since everything or nothing in the web 3.0 ecosystem can be considered externalities to the dApp. For the dApps to manage externalities, we have noted a tendency to focus on interoperability. The sample dApps relevant for our study are all somehow connected to Ethereum, even if they are not built on the Ethereum blockchain itself. Ethereum claims to be interoperable "by default", and companies can access and improve each other's businesses since they can connect to other smart contracts on the permissionless blockchain.[183] Both Dtravel and Drife are built on Binance Smart Chain, which is an EVM-compatible double-chain architecture. Minds is built directly on the Ethereum chain and DTube is built on Hyperledger Avalon, which is part of the Enterprise Ethereum Alliance.[184] Without making the technical aspects too complicated, we simply want to illustrate that all of the dApps are intertwined. This means that there will be differences in how externalities are managed. One clear example of this, which is also very similar to the web 2.0 environment, is the collaboration between Dtravel and the leading blockchain-based travel

[180] Minds Whitepaper, *The Crypto Social Network*, v0.5 (12/06/2022) https://cdn-assets.minds.com/front/dist/en/assets/documents/Whitepaper-v0.5.pdf.
[181] Makuch, Ben; Pearson, Jordan (May 28, 2019). *Minds, the 'Anti-Facebook,' Has No Idea What to Do About All the Neo-Nazis*. Vice (23/05/2022) https://www.vice.com/en/article/wjvp8y/minds-the-anti-facebook-has-no-idea-what-to-do-about-all-the-neo-nazis.
[182] Kaste, Martin (August 6, 2019). *Debate Over Policing Free Speech Intensifies As 8chan Struggles To Stay Online*. NPR. (23/05/2022) https://www.npr.org/2019/08/06/748810962/debate-over-policing-free-speech-intensifies-as-8chan-struggles-to-stay-online?t=1653387080599.
[183] Ethereum, *What Is Ethereum?*
[184] Enterprise Ethereum Alliance, *EEA Members* (23/05/2022) https://entethalliance.org/eea-members/.

agency Travala.[185] Dtravel uses the already established travel agency, probably to get acknowledgement, recognizability, and to facilitate ease of use and smooth launch. This could also be an example of lowering the friction of entry.

The interoperability is also enforced by the use of cross-dApp wallets for the collection and use of crypto currency and tokens. One example is the Ethereum based MetaMask wallet that makes it easy to swap Ethereum-based tokens and currencies with other token- and currency-holders between platforms.[186] This further illustrates the fact that the dApp sphere is more like a landscape (decentralized) where anyone can freely do anything allowed by the limits of the foundational protocol. We can also see the emergence of cross-chain wallets, to further increase interoperability in the metaverse.[187] If we consider web 2.0 and its elements as externalities, the wallets can also be used to manage these and to decrease the threshold for entry to web 3.0 (see just above).

5.1.3 Conclusions

Same

- *Positive* and *negative network effects*: A lot of the reasoning is the same or similar on web 3.0 dApps as on platforms.
- *Curation*: To retain users, dApps will have to perform some kind of curation to encourage high-quality content and limit the negative network effects. Depending on how the dApp is structured, this might be difficult since curation needs some kind of central actor making decisions on what to encourage.
- *Scaling/Side-switching*: If a dApp is centrally placed in a network, it will have to make sure to facilitate the side-switching, just like a platform needs to.

Different

- *Positive* and *negative network effects:* One aspect which will still be important, but which might be more complicated on dApps, is the management of users to increase the positive and decrease the negative network effects.
- *Two-sided*: A dApp is not always "sided" at all, due to the peer-to-peer structure and permissionless technology of the blockchain. The positioning in the network is a strategic choice which can be made by the creators of the dApp.

[185] Dtravel Whitepaper.
[186] MetaMask, *Introducing MetaMask Swaps*, 13/10/2020 (23/05/2022) https://medium.com/metamask/introducing-metamask-swaps-84318c643785.
[187] See for example the ONTO wallet, https://onto.app/ .

- *Scaling:*
    - *Frictionless entry:* There is more friction for users entering a dApp. Limited knowledge of the blockchain environment, the need for crypto wallets and cryptocurrency to be able to interact, and the lack of a centralized marketplace makes it more difficult for users to join dApps in general. Provided that the participant does have the needed knowledge and crypto-related requirements set up, the friction can be lower than when joining platforms. Also, more friction might be tolerated if there is more value created, for example by using tokens.
    - *Side-switching*: If a dApp is not centrally positioned in a network, facilitating side-switching will be less important as "sides" will not exist to the same extent.
- *Managing externalities*: The limits of what should be considered externalities are blurred due to the decentralized peer-to-peer system. Externalities in their traditional meaning can be managed through accessing the smart contracts of other dApps, managing interoperability, and building on each other's solutions.

5.2 Openness: Collaboration without Fractionalization

5.2.1 Presentation of Theory in Relation to Web 2.0

> *"A platform is 'open' to the extent that: (1) restrictions are not placed on participation in its development, commercialization, or use; and (2) any restrictions – for example, requirements to conform with technical standards or pay licensing fees – are reasonable and non-discriminatory, that is, they are applied uniformly to all potential platform participants."*[188]

Openness on a platform is not, however, a matter that holds only two binaries of either being open or closed. It is rather a question of implementing a level of openness that fits the purpose of the platform.[189] At the one end, the platform can be fully unrestricted with regards to who can participate in the development, commercialization, and use of different features. At the other, only a selected few are allowed to make improvements, add content, monetize on the platform, and access the platform benefits.

[188] Thomas R. E., Parker G. G. and Van Alstyne, M., *Opening platforms: how, when and why?*, p. 131, ch.6 in Platforms, Markets and Innovation Cover Author: Gawer, Annabelle Date: 2009 and Parker et al., *Platform Revolution*, p. 130.
[189] Parker et al., *Platform Revolution*, p. 131.

5.2.1.1 The Importance of Openness Strategy

As the level of openness determines the preconditions for the usage, development, monetization and regulation of the platform, implementing the correct level of openness for one's platform on web 2.0 is argued to be one of the most important elements for success.[190] While choosing a too open strategy might result in fragmentation and lower quality content, which might be unattractive to new participants of the platform, a too closed strategy can easily lead to struggles with solving both minor and major problems encountered on the platform due to the lack of sharing of resources and knowledge within or outside the platform itself.[191] Openness, which is argued to be good for innovation, might indeed enable the solving of these problems, but the notorious general drawback of lack of control remains, which can hamper monetization and IP-control.[192] Put simply, implementing the right level of openness is a matter balancing innovativeness and the value potentially added to the platform, with the content and functional quality on it.

5.2.1.2 Manager and Sponsor Participation

The parameters that should be considered when engaging in this balancing act are rather straightforward and, according to Parker et al., concern the level of participation on the platform.[193] *Manager participation*, where the manager role is responsible for "the how" of interactions between producers and consumers on the platform as well as the everyday management and organization.[194] Drawing a parallel to the organization of regular firms, this would be the CEO. *Sponsor participation*, where the sponsor supports and maintains the platform economically and legally. In general, the sponsor is the one developing long-term strategies and decides how for example the IP rights to the code, design and value should be distributed.[195] Again, compared to a firm, the sponsor is a combination of the shareholders and the board of directors.

Who is allowed to participate as managers and sponsors shows which openness model the platform employs. According to Parker et al., the most closed model is the *proprietary model*. Since the manager and sponsor is the same entity in this model, this leaves the greatest amount

[190] Parker et al., *Platform Revolution*, p. 131. See also by the same authors et al. Thomas R. Eisenmann, Geoffrey Parker and Marshall Van Alstyne, *Opening platforms: how, when and why?*, p. 131, ch. 6 in *Platforms, Markets and Innovatio*n, Cover Author: Gawer, Annabelle Date: 2009.
[191] Parker et al., *Platform Revolution*, pp. 131–132.
[192] Parker et al., *Platform Revolution*, p. 131.
[193] Parker et al., *Platform Revolution*, p. 135.
[194] Parker et al., *Platform Revolution*, p. 135–136.
[195]Ibid.

of centralized control.[196] In the *licensing model* there is a slightly increased level of openness since the manager and the sponsor are two separate entities.[197] The *joint venture model* opens the platform participation further. One actor acts as the manager, but instead of having only one other actor as sponsor, a number of other entities inhabit this function together. If the manager role is opened up to several entities as well, the openness model is *shared*.[198] This model is the most open participation model of the four.[199]

5.2.1.3 Developer Participation

Openness in terms of *developer participation* refers to the extent to which actors are allowed to create new kinds of interactions on the platform.[200] Parker et al. divides the category of developers into three sub-categories: *core developers*, *extension developers* and *data aggregators*.[201] All three types of developers help to create value on the platform.

Core developers create the "core platform functions" and "basic platform capabilities" by accessing and editing the software code and platform infrastructure.[202] By doing so, they are allowed to set the rules and preconditions for core interaction(s) to take place. The interaction rules are key, as interactions are the main enablers for value creation on the platform.[203] Due to the importance of the core developers' function, they are often under the supervision of the manager firm.

Extension developers are generally actors outside of the platform management or sponsorship. They develop extra features – extensions.[204] Some extensions can enhance the value generated in the core interaction, by either making them smoother and more accessible in themselves, or by adding surrounding options for interaction that can support the core interaction. A platform that wants to open for extension developers often provides APIs for accessing the platform.[205]

Data aggregators collect data from user activities and track the behavior on the platform, and sometimes cross sites, under a license agreement with the platform manager. The aggregated data are then sold back to the platform or resold to other firms for the purposes of for example targeted marketing or to analyze user patterns on the site to improve the user

[196] Parker et al., *Platform Revolution*, p. 136.
[197] Parker et al., *Platform Revolution*, p. 137.
[198] Parker et al., *Platform Revolution*, p. 137.
[199] Ibid.
[200] Parker et al., *Platform Revolution*, p. 141.
[201] Ibid.
[202] Ibid.
[203] Ibid.
[204] Parker et al., *Platform Revolution*, p. 142.
[205] Parker et al., *Platform Revolution*, p. 143.

experience.[206] Some popular, and somewhat controversial, examples of such data aggregators on web 2.0 are Google Analytics, Hotjar and the Meta pixel.

5.2.1.4 User participation

User participation basically refers to the extent to which the user can produce content shared to others on the platform. To prevent low quality or inappropriate content from slipping into the platform interface, the platform can limit the user participation through *curation*.[207] This has in some cases been managed by *human gatekeepers*, where a single or a few users decide whether users or content suit the platform values or not. However, this form consumes both time and money. Instead, a commonly employed method is *user curation*, where the software provides tools for collecting user feedback from which curating decisions are made.[208] For example, both Facebook and Instagram users are encouraged to report contents created by other users that they do not think comply with the platform standards. The posts are then removed, permanently or temporarily, by the platform. Uber and Airbnb, on the other hand, are governed more clearly by the platform users. The rating function implemented on the platform helps both consumers and producers to make informed decisions on whether to get involved with certain users or not. According to Parker et al. user curation is better, but more difficult to implement than curation by human gatekeepers. Also, human gatekeepers often consume a lot of time and money and might be inefficient in that sense.[209] The curation of a platform is often based on what Parker et al. refers to as *screening* and *feedback*. Screening is like a first step in the curation process, referring to the decision of who to let into the platform. Feedback encourages the let in users to behave in a desirable manner.

5.2.2 Analysis of Applicability on Web 3.0

A permissionless blockchain can be described as open as anyone can create and deploy a dApp. When looking at the openness of the dApp itself, we need to split it into two parts: its smart contract and the elements stored on a server. Both parts can, just like a web 2.0 platform, set up whichever restrictions the creators of the dApp wants them to have. Important to note is that the smart contract cannot be changed once it has been deployed, and therefore the degree of openness and inclusion on all levels need to be carefully considered as the smart contract is

[206] Parker et al., *Platform Revolution*, p. 144.
[207] Parker et al., *Platform Revolution*, p. 151.
[208] Ibid.
[209] Ibid.

created.[210] When it comes to the elements stored on a server, the html, files, etc., they are able to adapt and change at a later stage.

5.2.2.1 The Importance of Openness Strategy

As established above, the openness of a web 2.0 platform can be split into three main categories: development, commercialization, and use. When it comes to dApps, our view is that the *development* is treated quite similarly as for web 2.0 platforms. Even though Ethereum and other public permissionless blockchains are open for everyone to develop on, the dApps themselves practice some variations on openness in this part, since they build on programming languages employed on web 2.0 as well. For example, Minds uses an open-source software, Dtravel and Drife has a more closed development team of core developers and DTube has a team of chief managers governing the user-based developer community. In terms of *commercialization*, as long as the dApp exists on a permissionless and public blockchain, tokenization of "soft" values enables users to take part in the value created in the network. An example of this is how Minds reward user interaction with tokens. This makes it easier for users of Minds to turn their interactions into commercial activities, compared to users on many web 2.0 social media platforms which need collaborations with businesses in order to monetize their content creation. Therefore, there are arguably more opportunities to commercialize on a web 3.0 dApp than on a centrally controlled platform, if the dApp allows for it. In this sense, dApps can be viewed as more open, since it allows users to take part of the commercial value created on the dApps. When it comes to the *use*, the same applies. As long as the dApp is on a public and permissionless blockchain, anyone is welcome to use it as long as there are no restrictions set up by the app which means that the degree of openness can be chosen by the dApp.

If there are restrictions in terms of any of the mentioned categories it is, similar to platforms, relevant to consider how these restrictions apply to different users when determining the degree of openness of a dApp. This will follow from a combination of the rules in the smart contract and the blockchain it is deployed on.

5.2.2.2 The Pros and Cons of Openness on Web 3.0

One of the problems proposed by Parker et al. is that the platform can become too open. For example, if there are multiple sponsors there is a risk of lost simplicity and useability through

[210] Without going into too much technical detail, it should also be mentioned that the smart contract can be programmed with a method of versioning, which enables updates to its code. For more information, see Saini, Vaibhav (@vasa), *Smart Contract Versioning: How to Write Upgradable Smart Contracts*, Hackernoon, 28/02/2020 (12/06/2022) https://hackernoon.com/smart-contract-versioning-mr5x32db.

fragmentation.[211] This would lead to the unattractiveness of the platform. While we believe this to be somewhat true to the web 3.0 space as well, we would also like to argue that the users of web 3.0 are – at least currently – mainly attracted to the space *because of* its openness and that they embrace the fragmentation as part of the development process. The question would be for how long this can be an acceptable state, especially if the web 3.0 movement wants to expand the application and use of dApps. Fragmentation would effectively create mini networks instead of one big network, and, as follows by the logic of network effects, lower numbers of participants and interactions in one network might prevent network effects from happening. There are also examples of fragmentation of a dApp leading to a fork on the blockchain it is deployed on. This happened to the Steem blockchain after a clinch on the dApp Steemit.[212] Such development would inhibit the growth of the dApp.

As mentioned above, Thibault Schrepel points out that decisions made in a decentralized environment tend to affect only those who have made them. This could lead to an increased acceptance of the fragmentation on platforms, since it does not disturb users not involved in that particular decision-making. The fragmentation also enables DAOs to form, capturing social capital among a group of blockchain users.[213]

Especially in the emergence of web 3.0, we will most likely see the development of different methods to address fragmentation in the open blockchain landscape. Already now, we have seen dApps tackling the issues in different ways. One example is the above-mentioned jury system on Minds. Another is the launching strategy of Dtravel, where the current management is centralized.[214] We believe this is a way to create a more uniform foundation for the Dtravel dApp and setting the stage before opening it up to decentralized governance. The dApp wants to encourage network effects to create a community in which decentralization can be implemented later.

5.2.2.3 Lack of Control

Openness is, by definition, featured by lack of control which, according to Parker et al., leads to struggles with monetization and IP. This will probably be an issue on web 3.0 as well. The

[211] Parker et al., *Platform Revolution*, p. 140.
[212] As this is a complicated subject which we do not have the space or time to discuss further, we will not go deeper into it here. More information can be found on Baker, P., *Steem Hard Fork Confiscates $6.3M, Community Immediately Takes It Back*, CoinDesk, 20/05/2020 (12/06/2022) https://www.coindesk.com/markets/2020/05/20/steem-hard-fork-confiscates-63m-community-immediately-takes-it-back/ and Wikipedia, *Steemit* (12/06/2022) https://en.wikipedia.org/wiki/Steemit.
[213] Binance, *DAO-kryptoenheter: vad, varför och hur man köper dem*, 30/01/2022 (24/05/2022) https://www.binance.com/sv/blog/all/daokryptoenheter-vad-varf%C3%B6r-och-hur-man-k%C3%B6per-dem-421499824684903289.
[214] Dtravel Whitepaper.

level of openness in terms of IP can be chosen by the dApp just like by any other web 2.0 platform. However, we believe the web 3.0 space to follow a different logic, especially with regard to IP. On blockchain, NFTs can be used to capture and represent the ownership of IP, and the technology is used in different ways on different dApps to represent a vast variety of values. Thanks to smart contracts, the rules for using the NFTs are set by the creator of the NFT/IP, which provides control. On Drife, franchisees hold FNFTs to represent the right to open and maintain a Drife unit.[215] As NFTs can represent different values, they also open up the possibility of leveraging IP in more ways. Dtravel makes a good example as users can buy a Premium NFT created by Dtravel. This is a way to create a sort of loyalty program and provide user benefits, with the additional benefit that the Premium NFT can be resold on NFT marketplaces outside the dApp.[216]

5.2.2.4 Translating Participator Roles to the Web 3.0 Environment

As has been established, there are different types of participants surrounding web 2.0 platforms. The roles are not easily translatable to the dApp environment. We would argue that for example the function of the *manager* can be split into two parts. First, the everyday management and organization is to some extent handled by the rules established in the smart contract and some of the additional elements which are connected to it. Drawing from what has been decided by the dApp creators, they set out the core logic of the dApp and create the rules of the interactions.[217] When they have set the rules, they let it go – mainly. To explain, a parallel can be drawn to what Lessig's writing and discussion on the *code is law* concept. While the reasoning might be far stretched, the immutability of the smart contracts does set the outer boundaries of what is possible to do and allow on a dApp. Instead of a manager in the shape of a person or a firm making decisions on the organization and the management, it is established by the code. Since the role of the manager is important for the functioning of a business, this makes it even more important to ensure correct and appropriate programming of the smart contract before it is deployed to the blockchain. Second, some dApps choose to make use of human managers as well. An example of this is the DTube, which splits the users engaging in different development activities, such as coding and designing, into groups. Each group has a human manager, keeping track and organizing the work of the group.

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[215] Drife Whitepaper.
[216] Dtravel Whitepaper.
[217] Kaur, R., *What is the difference between smart contracts and DApps?*, DataDrivenInvestor, Medium, 18/04/2021 (12/06/2022) https://medium.datadriveninvestor.com/what-is-the-difference-between-smart-contracts-and-dapps-d252d88d32d3.

The *sponsor* of the dApp can also be viewed in two different ways. As it has the function of supporting and maintaining the legal and economic aspects of a dApp, it can be the creators of the dApp together with the developing team and the investors. But, if the dApp uses tokenization as a way of owning shares in it, it can also be the person or firm holding a pre-established amount of tokens who has the most control over strategic decisions. The level of openness when it comes to sponsors therefore depends on what is allowed for in the smart contract. The sponsorship is also manifested in the whitepaper of the dApp. To summarize, because of the decentralization and openness of the blockchain, many actors can share the (somewhat ambiguous) role of sponsor of a web 3.0 dApp in practice.

Some of the roles of the developers can also be viewed differently from web 2.0 platforms. While the *core developers* to some extent fill the same function in both environments, developing, on a dApp they might simultaneously act as sponsors depending on what openness is created through the smart contract. Before the smart contract is deployed, it is usually the same people who plan and create the dApp, therefore acting as managers in the initial stages before the smart contract is deployed. The openness of a dApp when it comes to core developers therefore depends on how the project is started. Some projects are initiated through an open invitation, like Minds or DTube, while some are more similar to web 2.0 platform development, started by a limited group of actors who want to create something together, like Dtravel.

The openness of a dApp when it comes to *extension development* highly depends on the interoperability of the dApp itself, the blockchain it is built on, and other blockchains. If a dApp wants to allow for the participation of extension developers, to create more value for its users, ensuring interoperability is key to encourage and facilitate such development. In the spirit of web 3.0, a lot of dApps allow for extension development by providing APIs and access to their smart contracts. An example of extensions developed by external actors are the token wallets, facilitating smooth transactions on the dApps.

We have not been able to find any clear examples or equivalents to the role of *data aggregators* on our dApp cases. However, their role and function on web 3.0 is an interesting topic for discussion with regard to curation, since analyses facilitated by the data collected by aggregators on web 2.0 are used for decisions on how to form the user base. In the web 3.0 setting, this is rather performed by tokenization,[218] and will be elaborated on in the next section.

[218] "Ethereum is building an economy based on value, not surveillance." Ethereum, *What Is Ethereum?*.

5.2.2.5 Curation

Many dApps take pride in being user curated rather than curated by human gatekeepers, hence the process resembles the one for user curation on web 2.0. For example, content on DTube is prioritized based on the number of tokens, which in this instance are comparable to likes, and are rewarded with a certain video. So are posts on the social media platform Minds. At the same time, if your post on Minds is taken down (by whom, is the question) the jury system makes it possible to appeal such a decision. There are discussions going on in the Minds community on the option for moving the decisional power of the jury to the blocking of certain content as well.[219] This is an interesting form of decentralized curation process similar to the one currently used by Facebook and Instagram, which makes us question the actual state of decentralization on the Minds dApp.

The flow of items showing in the user feed is curated by the response and feedback from the dApp user community rather than algorithms learning individual preferences from collected and aggregated behavioral data. The result is straightforward thanks to the token voting mechanism. One of the marketed pros of decentralized applications is privacy, as a response to the great opposition platforms on web 2.0 have met for their use of data aggregators for example for marketing purposes. Will the dApps be able to create a neat user experience without them?

5.2.3 Conclusions

Same

- *Development*: The openness in the development of many dApps is quite similar to the openness in platform development. It is common for the team which starts the dApp to keep, at least initially, a lot of the control over its development.
- *Use*: As long as the dApp is deployed on a public and permissionless blockchain, anyone is welcome to use it. However, similar to platforms, the dApps can restrict use to whichever extent they want.
- *Manager* and *sponsor:* The degree of openness in relation to these functions can be decided by the dApp creators, similar to how it works on many platforms.

Different

- *Commercialization*: As long as the dApp exists on a permissionless and public blockchain, users can take part in the value created in the network by the means of

[219] Minds Whitepaper, v2.

tokenization. Tokenization makes it easier to turn interactions into commercial activities. DApps can be viewed as more open in terms of commercialization.

- *Fragmentation*: Inherent decentralization and openness can lead to fragmentation that should somehow be governed to avoid negative effects. On the other hand, the community might even appreciate the fractionalization which enables for example DAOs to freely form which is a central part of the web 3.0 governance.
- *Control*: NFTs can be used to capture and represent the ownership of IP created by the dApp. The technology is used in different ways on different dApps to represent a vast variety of values. Thanks to smart contracts, the rules for using the NFTs are set by the creator of the NFT/IP, which provides additional control possibilities.
- *Manager* and *sponsor:* The roles are more complex, as the functions are fulfilled by both technological and human power – smart contracts and human managers. Since the smart contract is fixed, the dApps are arguably limited in openness. On the other hand, the dApp can choose an open structure for further development.
- *Data aggregators*: The data aggregators are not as present on dApps as they are on platforms. In the sample dApps, the function data aggregators have on platforms, gathering and drawing conclusions from data, is mainly filled by the use of tokens.
- *Curation*: The curation of content and behavior is driven by the tokenization models on each dApp, instead of for example algorithms. We question whether the dApps will be successful without the autonomous surveillance of users.

5.3 Architecture: Enabling Network Effects and Core Interactions

5.3.1 Presentation of Theory in Relation to Web 2.0

As mentioned above, platforms are complicated structures compared to pipeline businesses. This is especially apparent when setting up a platform business. While pipelines have a clear linear process, platforms are complex structures. Where should you even start? At the same time, the architecture of a platform is essential for its survival as poor design produces very low, if any value, and severely limits the potential of creating network effects.[220]

[220] Parker et al., *Platform Revolution*, pp. 35–36.

5.3.1.1 Facilitating Interactions – Three Exchanges

The model called architecture can be split into two parts – the *functions* of the platform and the *technical* architecture of it. Both types need to aim towards facilitating interactions between the users. In all interactions between different types of users on a platform, three things are exchanged – information, goods/services, and some type of currency. A main focus for platforms is to facilitate the exchange of *information*. An example of the exchange of information is when the Uber platform provides a future passenger with information about available drivers in their area. This exchange makes up the initiation of each interaction and for some platforms it is the whole value offering. Either way, it is in most cases what justifies the existence of the platform. The potential exchange of *goods or services*, also known as the value unit, depends on the decision made by the user as a result of the exchange of information. If they find something of interest, it might occur. This exchange sometimes happens through the platform, as when social content is uploaded and viewed on Facebook, and sometimes outside of it, as when an Uber ride is provided by a driver to a passenger. The final interaction is the exchange of *currency*. The term currency includes both traditional currency, such as a transfer of money, but also other types of value, such as attention, data, and influence. Just as with the exchange of goods or services, this exchange can take place through or outside of the platform. Exchanges through the platform are common when it comes to the "intangible" types of currency mentioned above. It can also happen through the platform even though the exchange of services or goods happens outside of it, as is the case with an Uber ride. A platform's ability to internalize the exchange of actual monetary payment creates more options for monetization as it can charge a cut from each transaction. A platform on which the main currency type is intangible instead needs to find ways of turning that into tangible currency, for example by charging third parties for the access to users' attention.[221]

5.3.1.2 The "Why" of the Platform – The Core Interaction

When designing a platform, the focus should be placed on the *core interaction*. Referred to by Parker et al. as "the why of the platform," it constitutes the most important exchange of value and is the reason for users to interact with the platform. If a platform manages to create a core interaction which is easy, or even fun, to interact with it will attract users and create a good environment for network effects. The core interaction can be split into three key elements which all need to be properly defined and used as a basis for architecture design decisions. These key

[221] Parker et al., *Platform Revolution*, pp. 35–38.

elements are the *participants*, the *value unit* (the offered goods or services as mentioned above), and the *filter*. The proper definition of the core interaction, and subsequently of the key elements, is crucial when designing a platform. While some platforms do have a more complicated architecture, the basic structure around the core interaction and its three key elements is always the same.[222]

There are two types of participants, the *producer* and the *consumer*. The producer is the participant producing the value on a platform, and the consumer is, naturally, the one consuming it. One user can have either role, or switch between them in different interactions, and both categories can have many sub-categories of users operating within them. Different platforms use different incentives to get users to participate on their platforms, but the roles are always consistent.

An interesting aspect of the *value unit* is that it is seldom created by the platform itself. Instead, it is the producer who creates this crucial element. This means that the platform has little control, other than through quality control measures and the below mentioned filters, over the value offered on it. It can mainly control who is able to create the value unit, how the creation happens, and how it is integrated into the platform. It is the producer's creation of the value unit that makes up the start of the core interaction, such as the posting of social media content on Facebook or the offering of a ride on Uber. The exchange of information cannot happen before there is a value unit up for offer. Which consumers should be able to see a specific value unit is decided by using *filters*, a tool based on software. The filter is what enables consumers to be reached by value units which are relevant to them and can for example take the shape of a search query. One way Uber uses filters is to only show drivers who are open to picking up riders and are on a suitable distance to the potential passenger looking for a ride.[223]

5.3.1.3 The "How" of the Platform - Pull, Facilitate, and Match

Moving on from the "why" to the "how" of the platform design, there are three key functions which are needed to enable a high occurrence of core interactions: pull, facilitate, and match.

The platform has got to *pull* in the participants to be able to enable interactions at all. Attracting users means facing the chicken-or-egg problem discussed in Launch, but also keeping the interest of them when they do visit the platform. A powerful tool which can be used is the feedback loop, which aims to create a constant self-reinforcing stream of value creation. Feedback loops can be either single- or multi-user. The single-user feedback loop uses data

[222] Parker et al., *Platform Revolution*, pp. 38–42.
[223] Parker et al., *Platform Revolution*, p. 39–44.

about a single user to figure out things about them, such as their interests and needs, and then feeds back content which is aligned with their preferences to keep them coming back for more. The multi-user feedback loop feeds a producer's actions to a consumer, and then the consumer's actions back to the producer. This goes on and on to encourage further interactions between the participator groups. The sheer size of a platform can also be a facilitator of its pull. Especially for platforms with intangible currency types, as the larger or more popular they are, the more valuable the currency, for example attention from other users, becomes, and the more pull is created towards the platform.[224] Finally, there is a possibility to leverage external networks of participants, using a piggyback strategy as discussed in Launch.

Once there are users on the platform, their interactions have to be *facilitated* through the use of tools and rules. As the platform does not create the value unit, the facilitation of its creation and exchange is an important function which needs to be secured. Tools for facilitating such actions can aim to encourage creativity, such as ones used for collaboration and sharing, or to lower barriers[225] of using the platform, such as limiting the needed steps which are needed to interact.[226]

Finally, the participant types, the producer and consumer, must be appropriately *matched* in a way which they both appreciate. Relevant information, and possibly goods or services, need to be presented in an efficient and complementary way. This is performed by using data about the core interactions and the exchange of goods and services. The larger the database the platform has access to, and the better the algorithm used on the data, the better the matching can become. Therefore, another important thing to consider when designing a platform is how it will be able to acquire data from its users. The sharing of data can be incentivized, encouraged through gamified interactions, or bought from third parties.[227]

The platform must manage to perform all of these functions well to succeed, if any of them fail completely the participants will start leaving. It is also important to continuously improve the functions, to keep up with the competition. There is no need to be equally good at all three, a platform can survive, at least for a while, by being good at one of them and okay at the rest.[228]

[224] Parker et al., *Platform Revolution*, pp. 44–46
[225] Not all barriers are bad, there are cases where they can have a positive effect on the number of interactions. They can for example be used to create trust in the platform. This is the case of Sittercity, as presented in Parker et al., a platform connecting babysitters with parents in need. Sittercity has set up strict rules (high barriers) on who can be a babysitter on purpose, so that the parents can trust in the service that is delivered.
[226] Parker et al., *Platform Revolution*, pp. 46–47.
[227] Parker et al., *Platform Revolution*, pp. 47–48.
[228] Parker et al., *Platform Revolution*, pp. 48–49.

5.3.1.4 Layering Functions to Scale

While the core interaction is the single most important value exchange happening on a platform, one way to scale successfully is to add several layers of functions. The layering can be done in several ways, for example by changing the value unit or adding new types of value units. Layering can also be done in relation to the users, by for example adding new types of users or curating existing users in order to create new user groups.[229] While adding features can be a great way to scale, it can also create a messy platform which is difficult to interact with. To avoid this problem, many platforms use the *end-to-end principle*. The principle establishes that non-core functions should be placed in the outskirts of the platform infrastructure. This prevents it from interfering and taking up resources from the core activities happening on the platform. It can also be beneficial to apply the principle to the design of a platform.[230]

5.3.1.5 Leveraging External Development Capabilities

In order for a platform to be successful when it comes to architecture, it needs to have a modular approach to system development. This means that parts of the system are created separately and then "attached" to each other to function as if they are an integrated whole. The attachment is enabled by application programming interfaces (APIs), which work as long as the parts of the system are developed in accordance with the rules of the platform. Offering external developers the possibility to develop for your platform by using APIs opens up a lot of possibilities to increase the reach of the platform to new markets. Keeping this in mind when designing a platform saves a lot of work, as most designs starting off as integral have to be redesigned to allow for modular system development in order to keep developing in a sustainable way.[231] It is important to remember that a lot of platform design is not planned, but rather emerges as users start interacting with a platform. Developing a platform should therefore always be seen as an iterative process. To allow for quirks and functions which were not part of the initial plan to become part of the platform design if encouraged by the users, the developers need to continuously iterate their decisions. In order to acknowledge such quirks and functions, the user behavior on the platform needs to be monitored.[232]

[229] Parker et al., *Platform Revolution*, pp. 49–51.
[230] Parker et al., *Platform Revolution*, pp. 52–54.
[231] Parker et al., *Platform Revolution*, pp. 54–57.
[232] Parker et al., *Platform Revolution*, pp. 58–59.

5.3.2 Analysis of Applicability on Web 3.0

5.3.2.1 Facilitating Interactions – Three or Four Exchanges?

We suggest that the aim in the design of any platform or dApp architecture is to enable network effects and to facilitate interactions. Within those wide frames, every platform and dApp can have different values and purposes which the architecture needs to reflect. Based on the sample dApps, we would argue that the goals of the dApps are pretty much the same as the goals of the platforms – however, on fairer terms. They aim to facilitate the same kinds of interactions, but the dApps aim to do it cheaper by eliminating middle hands (Dtravel), unrestricted by cutting out censoring parties (Minds), distributing the value created on or in connection to the platform activities to the producers (DTube and Drife). Hence, a mapping of the architecture on web 3.0 should include another "why" and another "how", but more on that in those sections below.

The tokenization could be seen as an additional way to facilitate interaction on web 3.0. In addition to the key exchanges of information, goods/services and currency, the web 3.0 requires another exchange element: *the token*. The function of the token would both have the function of retaining the participants on the dApp, but also to capture the excess value created, for example in the shape of content or attention. Also, there is no need to involve any third parties for the purposes of converting intangible value into currency on the dApp, since the conversion can be managed by the dApp itself through tokenization. The tokenization is purposeful for the consumer, since it often represents actual value and can be used in many different ways, for example to invest in producer content or, again, to interact on other dApps as well.

5.3.2.2 The "Why" of the DApp

When it comes to the core interaction, the three key elements (participators, value unit, and filter) are still relevant. Many considerations in relation to the *participants* and the *value unit* are the same on our sample dApps as on platforms, which still need to make sure to keep the same aspects in mind when designing those elements of the core interaction. However, the filtering needs to be further discussed.

An obvious question would be how the *filtering* to facilitate interactions take place in a decentralized environment, since there is no central authority to decide the parameters. From what we have been able to observe, the "filtering" is made by *freedom of choice*. The user, not an algorithm, actively picks the parameters on which they want the matching to include. For example, the rider on Drife will be able to choose drivers "[...] to optimize for driver rating, fare price, time for pickup, or based on specific criteria such as child seats, disability access, storage

capacity, car model, etc.".[233] Minds offers the ability to choose categories of popular content in a way that is very similar to processes on web 2.0. However, due to the open-source code that lays the foundation of Minds and the fact that it is deployed on a public blockchain, the participants can control that the categories are accurately set.[234]

As briefly mentioned above, the tokenization of value might create the need for an added element which needs to be considered in the core interaction: participator ownership. Whether it should be added or not depends on how one views the relation between tokenization and the "how" of the platform, which will be discussed further below. In short, if a token is an integral part of the value offered on a platform, the token should be added as a fourth key element in the core interaction.

5.3.2.3 The "How" of the DApp

Regarding the "how" of the platform, a lot of the considerations when it comes to the *pull* element are similar to web 2.0 platforms. An interesting aspect is however the correlation between the size of the platform and the intangible value created on it. Translating this to the dApp environment, the larger the dApp becomes, the more stable or recognized the token utilized on it should be, at least on the dApp itself. We believe this is the case as a large dApp is a result of a large number of interactions, and the interactions often include the exchange of tokens. A high number of exchanges should create a more stable value.[235] Therefore, if a dApp has a healthy and robust protocol which enables high usage, this can increase the value of its tokens. This means that, if a protocol is successful, that success will spill over on the token holders. This makes a lot of sense when it comes to DAOs, as such tokens often represent shares of the dApp or its community.[236]

In relation to the element of *facilitation*, as the blockchain environment can be perceived as unknown and scary, there can be value in creating an interface which users recognize. Similarity to existing user experiences and interoperability of the dApp with well-established blockchains can be used as tools to lower the barriers of interactions. The same goes for using standards when developing the token which enables it to work on well-established marketplaces, such as the Ethereum standards ERC20, ERC721 and ERC1155.[237]

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[233] Drife Whitepaper.
[234] Parker, *An Introduction to Minds: A deep dive into the main features of this open source, free speech social network*.
[235] Shuttleworth, *What Is A DAO And How Do They Work?*.
[236] Shuttleworth, *What Is A DAO And How Do They Work?*.
[237] See further Vogelsteller, F. and Buterin, V., *EIP-20: Token Standard*, Ethereum Improvement Proposals, 19/11/2015 (12/06/2022) https://eips.ethereum.org/EIPS/eip-20, Entriken, W., Shirley, D., Evans, J. and Sachs, N., *EIP-721: Non-Fungible Token Standard*, Ethereum Improvement Proposals, 24/01/2018 (12/06/2022) https://eips.ethereum.org/EIPS/eip-

The *matching* element is facilitated through incentivization and tokenization instead of data aggregation – which is against the web 3.0 spirit. As stated regarding curation above, this should be made possible by user interaction and transactions of tokens. The patterns providing better matching are created based on the users' own choices.

As has been briefly mentioned, the use of *tokenization* can, depending on how it is used, be seen as the "how" of a fourth key element of the core interaction or an added function layer which can be used to scale. We believe this depends on how incorporated the token is in the offering on the dApp. If the token is a key enabler in transactions, encouraging interactions and rewarding participants, we are inclined to call it part of the core interaction. The Drife token, which can be used for example to pay subscription fees, access discounts, and take part in the governance of the dApp, is an example of such use of tokenization. This is beneficial for the dApp as it is something that it can control, which is not the case when it comes to the value unit of the core interaction. In this case, the added "how" would be the tokenization of value. In contrast, if the token is an additional function, such as purchasable clothes or items in a game, it is easier to view it more as a layered function.

5.3.2.4 Layering Functions to Scale

In relation to the layering of functions as a means of scaling, a lot of the reasoning surrounding platforms is similar to that surrounding dApps. One additional way for a dApp to scale is through the addition of a token (if it does not have one), or additions to the traits of the tokens. This is applicable both in relation to creating new value on the platform and in relation to creating new groups of users. However, if doing so, it will be important to not let the tokenization overshadow the value unit of the core interaction, especially in the above-mentioned cases when the tokens are not considered key elements. If the token is to be or become the main exchange on a dApp, this needs to be a strategic decision so that the core interaction design is updated accordingly.

5.3.2.5 Leveraging External Development Capabilities

The use of APIs to allow for external development is common on web 3.0. An additional, already mentioned, way of leveraging external development capabilities is the possibility to connect to other smart contracts. As has also been discussed, when it comes to making use of

721 and Radomski, W., Cooke, A., Castonguay, P., Therien, J., Binet, E., Sandford, R., *EIP-1155: Multi Token Standard*, Ethereum Improvement Proposals, 17/06/2018 (12/06/2022) https://eips.ethereum.org/EIPS/eip-1155.

external development capabilities in the blockchain environment, interoperability is an important aspect to consider. This is discussed further in the model Openness.

In relation to considerations made when designing a dApp, there is a larger need to establish the foundational rules from the beginning. Compared to the iterative nature of the development of a platform, the immutability of smart contracts makes it so that some aspects of the initial architecture will be difficult (or impossible) to change without deploying a completely new dApp.[238] Careful consideration should therefore be made in relation to the architecture when the Whitepaper and the smart contract are created.

5.3.3 Conclusions

Same

- *Aim*: Enabling network effects and facilitating interactions are aims of both platforms and dApps. The aim can be based on different values and purposes, which need to be reflected in the architecture. The sample DApps are so far more inclined to offer services on fairer terms.
- *The "why"*: The same three key elements of the core interaction of platforms (participators, value unit, and filter) are relevant for dApps. The same goes for many considerations in relation to the *participants* and the *value unit*, which to a large extent are the same on our sample dApps as on platforms.
- *The "how"*/*Pull*: This element is to a large extent similar on dApps and platforms.
- *Layering of functions*: as a means of scaling, a lot of the reasoning surrounding platforms is similar to that surrounding dApps.

Different

- *Facilitate interaction*: The web 3.0 requires the token as another exchange element, in addition to information, goods/services and currency.
- *The "why"*
    - *Filtering*: Instead of through algorithms created by the platform, the filtering on many dApps is made through the freedom of choice.
    - Core interaction: Additional element needs to be added: the participator ownership.

[238] While this could be an option, it often creates issues with transferring data existing on the first version of the dApp. More on this can be found on Saini, *Smart Contract Versioning: How to Write Upgradable Smart Contracts*.

- *The "how"/Pull*: The correlation between the size of the platform and the intangible value created on it means that the larger a dApp becomes, the more stable or recognized the token utilized on it should be, at least on the dApp itself. (...) Therefore, if a dApp has a healthy and robust protocol which enables high usage, this can increase the value of its tokens. This means that, if a protocol is successful, that success will spill over on the token holders.
- *Layering functions to scale*: An additional way for a dApp to scale is through the addition of a token or its traits. This is applicable both in relation to creating new value on the platform and in relation to creating new groups of users.
- *Leveraging External Development Capabilities*: To be able to leverage external development capabilities, the dApp needs to enable interoperability through smart contracts.
- *Designing the architecture:* There is a larger need to establish the foundational rules when creating a dApp compared to a platform, as it is a lot more difficult to change.

5.4 Monetization: How to Exploit Value

5.4.1 Presentation of Theory in Relation to Web 2.0

It has been established that getting users to join and interact with a platform is key for a platform's existence and growth. Frictionless entry is needed, or users will not become recurring participants in the platform network. Regular ways of monetizing a business, such as charging for access or per interaction, might lead to less active users and reduced interactions which in turn leads to less data, all of which are needed on a well-functioning platform. They are all key activities in enabling network effects, and the reduction of them could be detrimental. If the owners want a thriving platform, one which they can make money from, they will have to keep this in mind when finding a way to monetize. There is a need to balance the friction the charges create with the risk of hampering activity. This is one reason why a lot of platforms do the complete opposite in order to gain initial participants – subsidize the participation. One way of doing this is by making it easy and fast to create an account and join the platform, an alternative is to use discount codes.[239]

[239] Parker et al., *Platform Revolution*, pp. 107–109.

5.4.1.1 Excess Value on Platforms

A lot of platform businesses do need to monetize in some way. Without monetization, it will be difficult for the platform to survive, as resources are needed to maintain and develop the offered service. There will also be less of an incentive for investors to provide resources if there is nothing in it for them. When searching for a suitable monetization strategy, Parker et al. describes a good strategy – identifying the *excess value* created on the platform and figuring out which of the sources can be exploited without limiting the network effects. Value categorized as excess is the type of value that would not exist without the service, and usually makes up a lot of the reason users participate on the platform. Four types of excess value are described, two of which bring value to both consumers and producers, one which brings value to consumers, and one to producers. For *both consumers and producers,* value is created through access to tools and services that facilitate interactions as well as through curation mechanisms that create more qualitative interactions. For *consumer* value is created through the access itself, for example to content on the platform. For *producers* value is created through the access to a market or community.[240]

As has been established above, measurements of network effects which only take into account the number of visitors on a platform do not show the whole image. Instead, it is the increase in desirable interactions, and discouragement of undesirable ones, which is important. If the participants invest in their participation, they are more likely to be engaged and have an actual interest in the value created. Hence, an appropriate monetization strategy can be used to steer interactions happening on the platform and increase their quality. Starting off in the excess value created on the platform, the next thing is to consider what such a strategy would look like for a particular platform.

5.4.1.2 Monetization Alternatives to Consider

There are four main ways to monetize a platform. One possibility is to *charge a fee on the transactions* the users make. The benefit of charging first when a transaction actually takes place is that it does not discourage participants from joining the platform network. However, it is important to find an appropriate level for the fee, to not hamper the transactions. Too high of a transaction fee also creates the risk that the participants make their transaction off-platform, to avoid it. To keep the transactions on-platform, the platform either has to limit the direct contact between producer and consumer or include value-creating activities which make the fee

[240] Parker et al., *Platform Revolution*, pp. 110–111.

worth it. The second alternative is to *charge for access* to the platform. This charge is best aimed at third-party participants who are not taking part in the core interaction. Instead, they are charged for other activities, such as posting ads. The third alternative is to *charge for enhanced access*. This means that the participants are able to take part in the network for free, but if they want additional value, they can choose to pay for it. Such additional value could be better placement or wider spread of their content. It is important to make sure that consumers see the difference between organically popular content and content which has been endorsed. It is also important to keep the integrity of the platform, so that the endorsed content does not take over the regular value creating curation. Finally, *charging for enhanced curation* is an option to get participants to pay for guaranteed quality. This is best used when there is a high demand for quality, such as for the baby-sitting service, Sittercity.

It is also important to consider who should be charged. Charging *all users* is an option which should be avoided as it tends to hamper participation. Charging *one side* of the platform while subsidizing the other works if the side being charged highly values the service they are offered. Charging *most users and subsidizing attractive users*, such as celebrities on a social network, can be a way of attracting a large number of users. Charging *some users while subsidizing price-sensitive users* can be a way of keeping users who are otherwise likely to leave the platform.

5.4.1.3 Changing monetization strategy – From Free to Fee

In order to establish a thriving network before having to make monetization considerations, many platforms start off offering their service for free. When transitioning from the free model to one where some kind of fee is charged, there are some things to consider. Always try to avoid charging for value or access that was previously available for free. Instead try to create new, additional value which the users can feel justifies the addition of a fee. In order to develop a suitable monetization model without creating too much friction, it is very important to consider the strategy from the beginning, while designing the platform.

5.4.2 Analysis of Applicability on Web 3.0

5.4.2.1 Excess Value on DApps

As with platforms, the maintenance and development of the dApp does not come for free, and a commercial monetization strategy might be needed to attract investors.[241] A struggle for

[241] Shuttleworth, *What Is A DAO And How Do They Work?*.

dApps is the Ethereum gas fee, which is an added cost to each interaction on the platform. This usually decreases the user friendliness of the dApp. Drife intends to solve this by following a subscription model, where the "administration" of the transaction in relation to the protocol is managed on the dApp, and relaying the gas fee from the user.[242] This function is enabled by tools such as Biconomy. Minds intends to do the same thing, to benefit the community.[243] On another note, DTube started off with a large funding in Steem Coins.[244]

In addition, despite the ideologist nature of the web 3.0 movement, dApps can of course be created with a separate commercial interest. Such interests are often closely connected to monetization. When there is a need for, or an interest in, monetizing the same considerations need to be made as for platforms – there will be a need to identify what excess value is created. The same types of excess value (access to goods or services, access to content, and access to a community or market) exist on many dApps as well. A difference is that such value can be easily captured by tokenization, for example by the process of objectifying positive externalities.

However, as tokenization can be used to create additional value, the risk of hampering interactions is lowered. We believe that in the balance between the friction created by monetization and the risk of hampering interactions, tokens can raise the bar for how much friction can be tolerated by the users. Depending on the structure of the dApp, we might also be able to add two additional types of excess value: the ability to partake in the governance and the ability to contribute to the existence of a dApp which a user considers valuable. Hence, a good tokenization strategy is key to monetization.

5.4.2.2 Monetization Alternatives for DApps

In terms of monetization alternatives, we believe that all of the strategies which can be used on platforms (charging a fee on transactions, charging for access, charging for enhanced access, and charging for curation) are usable in the dApp environment as well. The above-mentioned example of Drife charging a subscription fee is an example of charging for access.[245] An interesting addition is the alternative to monetize through tokenization.

Tokenization can be used both when it comes to funding development and maintenance as well as when attracting investors. There is a possibility to take advantage of a kind of crowdfunding, which will fund the creation, development, and maintenance of the dApp. An

[242] Drife Whitepaper.
[243] Minds Whitepaper, v2.
[244] DTube Whitepaper.
[245] Drife Whitepaper.

additional benefit of such crowdfunding, also known as Initial Coin Offerings (ICOs), is that they will attract users who believe in the dApp.[246] Many users will be able to invest in the dApp as the barriers will be lower and the process easier, a user will simply need to acquire tokens to invest, and the invested amount can be quite small. While this does not replace larger investments, users will be able to take on the role of investor and feel dedicated to the cause. This is beneficial as users' interests tend to be in line with the best interest of the applications, while traditional investors are often more interested in getting a return on their investments.

Other monetization functions can also be complemented or performed by tokenization. For example, tokens can be rewarded to subsidize initial interactions, to curate user groups, and to identify who should be subject to fees on the dApp. They can also create lock-in effects and feedback loops which make it easier for dApps to monetize transactions. Also, as mentioned above, two of the main goals of monetization – to attract investors and finance the maintenance and development of the dApp – can be largely or completely performed through tokenization.

Above, we mentioned that a well-functioning monetization strategy can work to increase desirable interactions, since users who have made investments on the site are more prone to involvement and dedication than users who have not. Implementing a tokenization system is an easy way to make participants invested. One example is the fact that there are already participants using web 3.0, partly thanks to the opportunity to acquire tokens with an inherent value, even though using web 2.0 is the easier choice. This could be said to have a function similar to one of the decentralization effects, whereas involvement and dedication increases when the participant needs to guard their own interests. The reward through tokenization, for investing time and other resources in the dApp, further enforces dedication and helps to retain the users on the dApp.

5.4.2.3 Changing Monetization Strategy

As for platforms, if the dApp starts off offering its service for free with the aim of monetizing later, this needs to be considered from the beginning. If a whitepaper is created, that is a perfect place to present a future monetization strategy. This would ensure transparency, and through that make the transition easier on the users. Establishing a monetization strategy early will also facilitate its inclusion in the smart contract.

[246] DTube White Paper.

5.4.2.4 Self-sustaining Token Economy

The dApps are keen on marketing their tokenized self-sustaining economies (*Tokenomics*), which is built on the token of the dApp. They have their own tokens, which are set to a limited amount of supply as well as released and allocated in different ways. The individual economic systems are too complex to elaborate on here, but they are using different selling, unlocking, and investing models to maintain the value of the token. They are usually released through a token release event.[247] Minds and DTube release a limited amount of tokens per day, due to their vast reward system, and have complex reward systems for "spending strategies".[248] Some examples are Mind's *Liquidity Rewards* based on participation in liquidity pools on Uniswap and *Holding Rewards* for holding the tokens on chain.[249] This further underlines the importance of a sustainable token strategy, in a complex crypto environment.

5.4.3 Conclusions

Same

- *Need for monetization*: Both platforms and dApps need to fund their development and maintenance and have a monetization strategy to attract investors.
- *Excess value*: Excess value created on a platform usually exists on a dApp as well.
- *Monetization Alternatives*: All the strategies which can be used on platforms can be used on dApps as well.
- *Changing strategy*: As for platforms, if the dApp starts off offering its service for free with the aim of monetizing later, this needs to be considered from the beginning.

Different

- *Excess value*
    - *Additional types*: Two additional types of excess value are created on the dApps: the ability to partake in the governance of a dApp and the ability to contribute to the existence of a dApp.
    - *Captured*: The created excess value can be captured by tokenization, for example by the process of objectifying positive externalities.
    - *Balance between value and friction*: Tokenization can be used to create additional value which lowers the risk of hampering interactions.

[247] See for example DTube and Dtravel Whitepapers.
[248] DTube and Minds (v2) Whitepapers.
[249] Minds Whitepaper, v2.

- *Monetization Alternatives*: An interesting addition on dApps is the alternative to monetize through tokenization.
- *Self-sustaining economies*: The dApps have their own tokens, set to a limited amount of supply, and which follows a complex system of allocation and incentive mechanisms to sustain the token value.

5.5 Governance: Participation and Fair Distribution of Value

"Governance is the set of rules concerning who gets to participate in an ecosystem, how to divide the value, and how to resolve conflicts."[250]

5.5.1 Presentation of Theory in Relation to Web 2.0

"Governance is necessary because absolutely free markets are prone to failures"[251] – regulations and restrictions are ways to ensure a platform's wealth if they 1) limit the rate of bad or non-purposeful interactions and 2) make sure the value is distributed fairly.[252] As such, openness and governance are closely related. Furthermore, Parker et al. compares platforms to states, whereas governance is the means for creating wealth that should be distributed among the value providers. Considering that the user base of some platforms covers more people than any state's population, the platform owners fill an important function, comparable to unselected leaders, with regulatory power.[253]

5.5.1.1 Allocation of Value and the Diversity of Interests

With this background, along with the platform competitive landscape as described in Section 3.1.1.1 *Web 2.0 Competitive Landscape*, a key aspect of the governance of web 2.0 platforms is the allocation of value created not only inside the platform firm itself but also value created in the ecosystem of which the platform is part.[254] Managing multi-sided platforms offers a larger number of challenges and struggles. On these platforms the number of stakeholders and interests are high and unlikely to align.[255] This should be an even more difficult feat if the whole ecosystem is considered. The governance structures are there to acknowledge and manage these interests and to solve conflicts that are likely to arise from contradictions between them. They

[250] Parker et al., *Platform Revolution*, p. 158
[251] Parker et al., *Platform Revolution*, p. 182.
[252] Parker et al., *Platform Revolution*, p. 161.
[253] See Parker et al., *Platform Revolution*, pp. 159–160 on the amount of Facebook, Twitter, and Google interactions. However, see for example the discussion about web-sovereignty being selected by the users making choices about in which spaces to spend their attention, Lessig, *Code 2.0*, pp. 288–293.
[254] Parker et al., *Platform Revolution*, pp. 158–159.
[255] Parker et al., *Platform Revolution*, p. 159.

also ensure that all the participating sides create benefits for one another and that the value is really captured through interactions on the platform.[256]

5.5.1.2 Managing Interactions to Avoid Market Failures

By managing the interactions in different ways, the platform can support purposeful interactions and transactions, and prohibit unpurposeful ones.[257] According to Parker et al., such unpurposeful interactions – the ones which do not mutually satisfy both parties of an interaction, where for example one party is cheated – are *market failures*. They are caused by: 1) Information asymmetry; 2) Externalities; 3) Monopoly power; and/or 4) Risk.[258]

Information asymmetry refers to when a participant has information that puts them in a more favorable position in relation to another interaction participant and is able to use that position to get a better deal.[259] The information asymmetry can be visible between either users of the platform or between the managing firm and the users.[260]

Externalities refers to when a third party is affected by an interaction. The third party can suffer the effect of *negative externalities*, which could be compared to for example passive smoking, where the third party's health is affected by someone else smoking a cigarette. A platform example is when for example WhatsApp asks a user for access to their phone contacts. By the user accepting, an interaction takes place that affects the privacy of the contacts.[261] *Positive externalities* are instead benefits that can spill over to one or a number of other third parties. Parker et al. gives the example of recommendations of products directed to specific users based on what other users with similar taste have liked, which creates a better user experience.[262] *Public goods*, a type of positive externalities, refers to when value is created that benefits all or many participants.[263] For example, the articles collected on the publication platform Medium, constitutes a public library from which everyone can learn. Even the comments, which essentially only relate to the article post itself, serves this purpose since it helps to confirm, reject, or nuance the opinion or facts presented by the author. However, Parker et al. argues that some kind of incentivizing governing mechanism often is required for participants to invest in the creation of public goods.

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[256] Parker et al., *Platform Revolution*, p. 159.
[257] Parker et al. uses the terms "good" or "bad" interactions. We changed this to "purposeful" since we thought that was a more accurate description. Parker et al, *Platform Revolution*, p. 162.
[258] Parker et al., *Platform Revolution*, p. 162.
[259] Ibid.
[260] Parker et al., *Platform Revolution*, p. 164.
[261] Parker et al, *Platform Revolution*., p. 163.
[262] Parker et al., *Platform Revolution*, p. 163.
[263] Ibid.

When a party holds the supplying power of something valuable and is, as a result, able to hold a dominant position, that actor has *monopoly power*. The dominant position as such does not cause market failures. Instead, that happens when the party exploits its dominance for its own benefit at the expense of other participants as this is unlikely to lead to mutually satisfactory interactions.[264]

Like every other business, the use of platforms is exposed to unpredictable *risks* that can cause an interaction to turn from purposeful into un-purposeful. These risks can spring from both internal and external sources and depend on the business. We will not elaborate on this further here, but risks in general will be discussed below.

5.5.1.3 Tools for Governance

According to Parker et al., there are four tools for governing the platforms and to address the causes of market failure mentioned above.[265] They have translated or reworked the Lawrence Lessig framework explaining what governs "cyberspace", following the broad categorization of *laws*, *norms*, *architecture* and *markets*.[266] The authors furthermore relate these categories of governance to the principles suggested by Alvin Roth, according to whom market failures are addressed by the increase of: 1) *safety* on the market (or platform ecosystem), by means of transparency, quality or insurance; and 2) *thickness*, by creating a crowded space facilitating more frequent and purposeful cross-side interactions. However, 3) *congestion* should be minimized since it decreases the chances of getting accurate search results and where low-quality contents outnumbers high quality contents. So should (4) *redundant activity*, such as porn and other unethical content.[267]

Laws – The Codified Rules of the Platform

The *Law* category regards the explicit rules of the platform that can govern both the users and the ecosystem.[268] The rules are often formalized in a document explaining terms and conditions for use of the platform. The rules can affect both users, by for example allowing them to share their account with their family members, and the developers, by proclaiming a requirement of code review before their contributions can be added to the platform. In addition, it can include ownership of IP rights and what the sanctions for breaching the rules are. However, rules can

[264] Ibid.
[265] Parker et al., *Platform Revolution*, p. 164.
[266] Parker et al., *Platform Revolution*, pp. 164–165, with reference to Lawrence Lessig, *Code and Other Laws of Cyberspace* (New York: Basic Books, 1999).
[267] Parker et al., *Platform Revolution*, p. 164 and Roth, Alvin E., *Harvard Business Review*, 2007, (27/05/2022) https://hbr.org/2007/10/the-art-of-designing-markets.
[268] Parker et al., *Platform Revolution*, pp. 165–166.

also be more directly related to what a user is allowed or not allowed to do on the platform and be enforced in different ways. For example, platforms often have policies regulating sexually explicit or violent content.

Parker et al. advocate open and immediate encouraging feedback to promote good behavior on the platform, through for example rewards for posting content or interacting with other users' content, and slow and subtle feedback to bad behavior to prevent the rule breaker from understanding the sanction system and being able to work around the rules.[269]

Norms

Norms reflect behaviors and constitute the implicit rules of the platform. They are both created by and reflected among the participants on the platform. It takes some effort to create norms, but the result can be powerful.[270] This can be done by means of *behavioral design* and, more specifically, the feedback loop proposed by Nir Eyal building on enabling mechanisms of *triggers*, such as notifications, encouraging an *action*, which should be frictionless and lead to a reward. The reward should encourage the user to *invest* more time, data, social capital and/or money, to enforce commitment and to thereby trigger another feedback loop.[271]

According to Parker et al., referring to Ostrom's theory of the governance of commons, the platform benefits from when the participants take part in the governing of it.[272] We will not elaborate on this theory, but the importance of *transparency* is stressed by Parker et al., as means to prohibit manipulation from other participants and the platform itself.[273]

Architecture

Architecture simply refers to the software code of the platform, and how the functions providing for example interactions are built.[274] Parker et al. argues that well designed platforms are self-improving, by rewarding and incentivizing good behavior. This is further elaborated on in Section 5.3 *Architecture*.

Markets

By managing *markets* and their mechanisms, and designing incentives by what Parker et al. call *fun, fame* and *fortune,* purposeful interactions can take place.[275] Interestingly, they argue that

[269] Parker et al., *Platform Revolution*. p. 167.
[270] Parker et al., *Platform Revolution*, p. 167–168.
[271] Parker et al., *Platform Revolution*, p. 168.
[272] Parker et al., *Platform Revolution*, p. 169.
[273] Parker et al., *Platform Revolution*, p. 169.
[274] Parker et al., *Platform Revolution*, p. 170.
[275] Parker et al., *Platform Revolution*, p. 173.

social currency is often a more valuable resource on platforms than monetary currency and therefore social currency should be the main focus when managing market mechanisms. Social currency is gained and reinvested by reputation on the platform, sprung from likes, shares, followers, good reviews or other kinds of credit that the platform facilitates.

Market mechanisms can be used to incentivize the creation and sharing of IP on the platform. Sharing of IP, as well as open and transparent collaboration, enables more efficient innovation. In this respect, there is an important discussion of whether the creator should own the rights to the IP or if the platform should. A few years ago, Instagram and Facebook caused headlines and community opposition when publishing their new terms and conditions, including clauses of rights to the users' uploaded images. The new terms granted Facebook and Instagram a very generous license, to use the pictures for the platforms' own purposes.[276]

Market mechanisms should also be governed to reduce risk in interactions on the platform. According to Parker et al., platform owners have historically tried to avoid responsibility, but several cases show that the unwillingness to compensate for, or insure the users against, any damage caused to them by platform interactions can hamper growth.[277] If the risk is too high, new participants will not enter. Common governing strategies are risk pooling and insurances with the aim of reducing participant risk and maximizing value creation on the platform.[278]

5.5.1.4 Self-governance

The platform should also practice efficient self-governance. Applying the same rules to the platform as to partners and participants helps to improve the platform's results. According to Parker et al. self-governance should follow the three main principles of internal transparency, participation, and the deep design principle of just and fair governance. This is to avoid that the platform sets rules that (only) favors themselves. If third parties can innovate to contribute to the platform, knowing that the terms are fair for all parties they are more likely to create value that benefits the platform as well.[279]

Internal transparency and sharing of information and competences between divisions is key to solve complex and multidimensional issues. Preferably, external users and developers are allowed to make improvements of the platform together with the managers. By

[276] Se for example Law Offices of Craig Delsack LLC, NYCCouncel, *Your Social Media Rights: Who Owns the Photos and Videos You Post on Facebook, Instagram or Twitter?*, 2012 (21/05/2022) https://nyccounsel.com/2012/12/19/who-owns-photos-and-videos-posted-on-facebook-or-twitter/.
[277] Parker et al., *Platform Revolution*, p. 175. Even though the platform manager is able to somewhat regulate the behavior of the participants, the platform itself is seldom held accountable for crimes and misconduct carried out in breach of nation state law in relation to platform interaction, see Parker et al., *Platform Revolution*, p. 165.
[278] Parker et al., *Platform Revolution*, p. 176.
[279] Parker et al., *Platform Revolution*, p. 181.

collaboration, platforms can employ all available resources and help consistency, which in turn facilitates growth.[280]

Closely related to enabling external contribution lies the principle of *participation*. External partners and stakeholders should be able to take part in the platform's internal decision-making processes. If no external parties are involved, platforms tend to make decisions that favor the platform itself, which does not encourage external participation and the urge to enter.[281]

Last, but not least, there is the *deep design principle* proclaiming *fairness*. Just and fair governance is accomplished in two ways. Firstly, if participants are treated fairly, they are more likely to feel confident in sharing ideas, which in turn promotes innovation. Secondly, participants will know that they will get a fair share of the value created, which encourages them to allocate resources in a way that creates more value in the ecosystem.

From what has been explained above, Parker et al. propose three fundamental rules of good governance: "Always create value for the consumers you serve; Don't use your power to change the rules in your favor; and Don't take more than a fair share of the wealth".[282]

5.5.2 Analysis of Applicability on Web 3.0

As has been established, decentralization is a key characteristic of permissionless blockchains and "authentic" dApps. Decentralization and governance usually do not go hand in hand. Traditionally, we often choose to establish central authorities and give them the power to govern. The power is designated through democratic processes, where a larger group of people decide on who is suitable to make decisions on behalf of them. Examples of such authorities are heads of states or boards of directors. Centralization is generally preferred as it enables a more efficient process. Less people involved means it is easier to agree on decisions, which makes the governance less time consuming, clearer, and more adaptable.[283] A downside of centralization is that few, if any, actors have the ability to govern in ways that suit everyone. Also, as all of the power lies with one or a few actors, it is easy for actors to govern in ways which are preferable for them without taking in all relevant perspectives.

The swiftness of centralized decision making is probably a major reason as to why many dApps start off with a centralized governing structure. Despite going against the decentralized spirit of web 3.0 community, limiting the governance of a platform can help make sure to get things in order when starting up the dApp. This is how Dtravel is planning on enabling initial

[280] Parker et al., *Platform Revolution*, p. 176.
[281] Parker et al., *Platform Revolution*, p. 178–179.
[282] Parker et al., *Platform Revolution*, p. 179–180.
[283] Ethereum, *Web2 vs Web3.*

growth and adaptability to demands from the participants while getting started. They will slowly transition towards decentralization as the dApp is established.[284]

5.5.2.1 Managing Interactions to Avoid Market Failures

Governance can be split into two parts: the governance of the dApp community and the self-governance of the dApp. In relation to the governance of a dApp community, the need to avoid market failures through unpurposeful interactions will naturally be an important aspect of the web 3.0 environment as well. Governance of communities will be a means to decrease the risk of such interactions. Failures due to *information asymmetry* might be less common on web 3.0. DApps deployed on a public blockchain are transparent, and anyone can access the code behind them to check how they are programmed and what rules are applied to interactions. However, the possibility for anyone to access information does not necessarily mean that all users know how to access, or are able to understand, the information they are provided on the blockchain. Also, the information asymmetry might relate to other aspects than what is explained in the code. Therefore, uneven knowledge distribution between parties risks creating unpurposeful interactions on dApps as well. According to Roth, actual transparency is needed to ensure safety in the transactions, a mere illusion of it is not enough.

In terms of *externalities* a parallel can be drawn to the public good and how there is a need for incentivizing actions that promote it in comparison to actions which are beneficial for the single user. In the web 3.0 environment, such actions can easily be encouraged by tokenizing the effort put into it. An example of this is how Minds distributes tokens to creators of blog posts. The tokens can later be used to boost a user's content or access premium features on the dApp.[285] DTube uses a similar system.[286] Another example is how the DAOs work as a way of managing the public good – the protocol. The DAO governs and invests in the decision making and are incentivized by the fact a robust and good protocol will benefit themselves, not only the users connected to the protocol.

For positive externalities Parker et al. point out the inability of the platform to capture that extra value as an issue from a business design point of view.[287] On web 3.0 this is also solved by the means of tokenization, where the use of tokens creates value (by enabling value creation for the users) for the dApp as well.

[284] Dtravel Whitepaper.
[285] Minds Whitepaper, v2.
[286] DTube White Paper.
[287] Parker et al., *Platform Revolution*, p. 163.

When it comes to *monopoly power*, the decentralization of governance is a way of reducing the power of one specific user. The distribution of tokens might increase the risk of monopoly power if not governed properly. If the tokens represent ownership in the dApp or can be used to vote on decisions, a user could potentially reach an amount of tokens which gives them the power to influence decisions in a way which reduces the decentralization of the dApp. If the tokens represent other types of value on the platform, such as currency or the ability to boost content, it is easy for a user holding a lot of tokens to create and maintain a monopoly position in the dApp community, for example by promoting their own content. The risk of this can be limited through proper governance of token traits. To summarize, monopoly power risks causing bad interactions on dApps as well.

5.5.2.2 Tools for Governance

Of the tools for governance, originally suggested by Lessig, we will touch upon laws, norms, and markets, but leave architecture behind. We think we have made the different aspects of architecture clear in the previous section. The governance by *laws* of the dApp can be translated to governance by white paper and smart contract, since they set the preconditions for action and the community rules for the dApp to follow. An interesting aspect with the governance by smart contracts is that it partly prohibits "unlawful" interactions. Hence, the sanction of bad behavior – a behavior that is unauthorized by the smart contract – is simply that the command will not go through. However, there are also community rules on some dApps. The enforcement of these will probably work more or less in the same way as on web 2.0. The reward for "purposeful" behavior is facilitated through tokenization and rather transparent, which is desirable according to Parker et al.

The dApp frontend code is the formalization of the behavior design, and, by extension, one of the sources for *norms*. In a decentralized, community driven network, the group of people initiating feedback loops to govern the behavior of users will likely be both vast and diverse. This is challenging, especially considering the principles for functional governance of public goods (commons) provided by Ostrom. Ostrom identified a number of design principles that are key to successful and sustainable governance of public goods in communities where no individual actor claims to own the resources.[288] These would be interesting to review in the setting of web 3.0, since the blockchain and web 3.0 environment's decentralized nature and

[288] Compare with centralized systems as explained above. See Parker et al., *Platform Revolution*, p. 169 with reference to Ostrom, Elinor, *Governing the Commons: The Evolution of Institutions for Collective Action*, New York: Cambridge University Press, 1990.

metaverse status resembles these community governed public resources studied by Ostrom. We will not review the theory in its entirety. However, an interesting element of Ostrom's theory is the nested tiers required for certain governance tasks as the community grows. We believe that the occurrence of DAOs can be sprung from this need.

When it comes to the governing of *market mechanisms*, we have focused on the incentives for sharing innovation and ownership of IP. Since there is no central force deciding how to distribute, or absorbing a large share of, the value leaving less to other contributors, the value stays with the creators. However, the openness and decentralization would only be ideology if it was not for the tokenization processes enabling the provision and distribution of value. The tokens are a way to formalize the governance and also make the value distribution transparent. They can be a way to incentivize innovation through rewards.[289]

However, it is interesting to note the OpenSea policy for owning of content published to their marketplace. The OpenSea Terms of Service holds similar clauses as the ones above mentioned to be criticized by the community of Facebook and Instagram. Even though the creator remains the owner or rights holder to a certain piece, the OpenSea platform acquires a rather broad license to use user created content for business purposes.[290] According to Parker et al., the owner of the content should get some kind of compensation for the license.[291] Of course, one can argue that the owner gets to publish the content on the dApp and get a license to use the service, but that should be considered a bare minimum of a service. More interestingly, this is an example of how an amount of value created does not get distributed to the creators themselves but is claimed by the platform. Conclusively, this does not follow the tokenization pattern otherwise characterizing the web 3.0 environment and hence has some web 2.0 "leakage".

5.5.2.3 Risks

When it comes to *risks* and the likelihood of them limiting the amount of interactions, the uncertainty of the web 3.0 environment might make users less inclined to participate. Also, as the applicability of regulatory tools, such as national or regional laws, is yet to be established, there is less security for users acting on a dApp compared to on a web 2.0 platform. This puts higher demands on the users of a dApp, as they need to take care of themselves. It also puts

[289] Comparable to the social currency used by SAP to incentivize innovation, see Parker et al., *Platform Revolution*, p. 174.
[290] "We're not saying we own it. We're just saying we might use it and show it off a bit." OpenSea, *Terms of Service*, p. 7 Intellectual Property Rights (25/05/2022) https://opensea.io/tos.
[291] Parker et al, *Platform Revolution*., p. 174–175.

higher demands on the dApps themselves. They need to take on more responsibility when it comes to lowering the risks in order to encourage interactions and enable network effects.

Who would be considered responsible for a dApp without a central governing authority? We assume most dApps would prefer to not appoint anyone to avoid centralization (and by extension the responsibility in itself). We believe one way to do this is to allocate responsibility to the community. Spreading the risk among the users might make it be perceived as lower and limit the negative impact of insecurity. This would work kind of like an insurance company and goes in line with the web 3.0 communal spirit. At the same time, the prospect of taking on risks might limit users' will to interact on the dApp at all. There are also more explicit insurance initiatives for web 3.0, such as Etherisc.[292]

As long as the responsibility is not put on a certain person or entity, there is uncertainty in relation to what would happen if something went wrong on the dApp. We believe this is undesirable as if something bad enough were to happen, the responsibility might be placed on someone in a legal process. This might affect individuals who are unaware of their responsibility in the first place.

5.5.2.4 Self-Governance

The *self-governance* is generally less complicated on dApps. The internal transparency is ensured if the dApp is on a public blockchain. The same goes for the participation, as long as the dApp is deployed on a permissionless blockchain, with the limitation of restrictions set up by the dApp in the smart contract. The main added element in relation to dApp self-governance is the additional tool offered through tokenization. Interactions can be incentivized, and therefore governed, through effective use of tokens as rewards or payment. Also, if they represent ownership or stake in the dApp, this creates additional incentives for good decision making.

5.5.2.5 Decentralized Governance

Another aspect important to govern on web 3.0 will inevitably be the level of decentralization, which is not a binary question. As has been argued above, higher level of decentralization risks to lower the user friendliness through fragmentation and it can hamper purposeful interaction due to the likelihood of congestion. According to the Ethereum developer Santiago Palladino, governing decentralization is also important for the developer experience, which is crucial if

[292] See Etherisc website, https://etherisc.com/.

the dApp wants to employ a more open developer-model. From a user perspective, he expresses it as follows:

> *"Some DApps will favor decentralization over ease of use and require users to access them with a specialized browser or browser extension. These extensions act as wallets, holding the user's keys, and also as a gateway to the blockchain by providing a connection to an Ethereum node. Under the hood, they inject a javascript object that provides low-level methods for accessing blockchain data and sending transactions on behalf of the user. Whenever the application requests to send a transaction, the user is presented with a pop-up to approve it. This moves much complexity from the DApp onto the extension, but also requires a large effort from the user to get set up, by installing the extension, creating and backing up an account, and purchasing ETH to begin operating."*[293]

Another drawback from this setup is the lack of control for the user, since the keys are held by the dApp, which could also cause issues for interoperability.[294] With decentralization there are also longer processing times for certain actions. Palladino suggests that this is solved by governing the level of decentralization.[295] Ways of managing this is for example:[296]

- Using centrally owned servers, facilitating faster access to the data;
- Frees the users from the complexity of interacting with the smart contracts on the network, by taking the responsibility for operating transactions with a temporary key;
- Take on certain costs for such transactions (for example gas fees), in order to free the user from having to pay for each transaction;[297] and
- As has been exemplified above, use different levels of openness in the participation structure of the dApp.

This corresponds to the three axes for analyzing decentralization suggested by Vitalik Buterin, explained in Section 3.1.2.2 *Decentralization*, which should be considered when designing a government structure for the dApp. The dApp developer needs to analyze the knowledgeability of the targeted user base, as well as their acceptance for fragmentation.

[293] Palladino, *Ethereum for Web Developers*, p. 10–11.
[294] Ibid.
[295] Ibid.
[296] Ibid.
[297] Biconomy provides such solutions, which are used by for example Drife using a subscription payment model, see Biconomy, *Go Gasless*.

The dApps themselves can of course be fully centralized, functioning and being governed in practically the same way as on web 2.0. The great difference is that they are operating on a decentralized protocol. The user data and activities go through the protocol, which provides security, privacy, and transparency. The users have full control of their data and can easily transfer it to another dApp.[298]

5.5.3 Conclusions

Same

- *Market failure*
    - *Information asymmetry*: Uneven knowledge distribution between parties risks creating unpurposeful interactions and causing market failures on dApps as well.
    - *Monopoly power*: Uneven distribution of power between the users risks creating unpurposeful interactions and causing market failures on dApps as well. The power of a user can also be stronger if the use of tokens is not properly governed.
- *Tools for governance*:
    - *Norms*: The enforcement norms will probably work more or less in the same way as on web 2.0, by the means of tokenization.
    - *Markets:* The tokens are a way to formalize the governance and also make the value distribution transparent. However, the same kinds of logic in terms of owning user creations is emerging on dApps such as OpenSea.

Different

- *Market failure*
    - *Information asymmetry*: When it comes to aspects expressed in the smart contracts, the uneven knowledge distribution is to a large extent caused by the difficulty of accessing the information, rather than its confidentiality.
    - *Externalities/Public good*: Are more easily facilitated on dApps than on web 2.0, as tokenization can capture the created value. Tokens can be used as rewards, encouraging purposeful interactions without too much expense for the dApp.
    - *Positive externalities*: Tokenization solves the issues for applications to capture excess value from positive externalities.

[298] Palladino, *Ethereum for Web Developers*, p. 10–11.

    - *Monopoly power*: If tokens are used as shares or other types of voting mechanisms, the users can, in addition to having monopoly power on the dApp, actually take power over decisions in relation to the dApp itself depending on the governance in relation to the tokens.
- *Tools for governance*
    - *Laws:* The laws of the dApp can be translated to governance by white paper and smart contract. Smart contracts prohibit "unlawful" interactions and commands that are unauthorized by the smart contract will simply not go through.
    - *Norms*: A decentralized diverse community driven network is challenging, especially considering the principles for functional governance of public goods. We believe DAOs are a governance structure sprung from these issues.
- *Risks*:
    - *Lack of regulation*: The web 3.0 environment puts higher demands on the users of a dApp, they need to take care of themselves. It also puts higher demands on the dApps as they need to take on more responsibility to lower the risks in order to encourage interactions and enable network effects.
    - *Responsibility*: The question of who is responsible for a dApp without a central governing authority is unestablished. This creates a risk for the dApp community, as someone who is unaware of their responsibility might be found responsible if something were to happen.
- *Self-governance*: Internal transparency is ensured if the dApp is on a public blockchain. As long as the blockchain is permissionless, participation is practically unlimited. The main added self-governing element in dApps is the tokenization.
- *Decentralization*: Many users are attracted to the web 3.0 environment because of decentralization, but this will affect the usability of the dApp. Therefore, decentralization needs to be properly governed.

5.6 Launch: Attracting Users

5.6.1 Presentation of Theory in Relation to Web 2.0

The model Launch in Platform Revolution relates to a shared subject of interest for newly started companies - how to best attract users. When it comes to platforms which simultaneously try to serve two sides of the market, the biggest issue to overcome is commonly known as the

chicken-or-egg problem. Which side should you start with when both sides are needed to attract users of the platform? In other words, neither type of user has a reason to join before the other type of user is present.[299] An additional factor which makes the launch more complicated is that it is not enough that users simply join the platform. They have to actually engage with the offered service, enjoy it, and become regulars for the platform to take off. User commitment, more so than user acquisition, is key.[300]

Marketing is an important tool to be used when establishing a new business. When it comes to platform marketing, pull strategies attracting users organically are much more effective than push strategies forcing users to your platform. This differs from the traditional pipeline businesses, where the interactions with users are fewer and further apart. On a platform network there is more space to share, and more alternatives poking at the users' attention. This means that it is not enough to capture the attention by pushing ads, instead incentives need to be used to pull users in.[301]

The PRF presents eight different strategies which they have identified as common to use, alone or in combination, to overcome the chicken-or-egg problem:[302]

1. The follow-the-rabbit strategy - model success in a non-platform business and then convert it into a platform.
2. The piggy-back strategy - find users on existing platform and recruit them.
3. The seeding strategy - create value units which are wanted by one type of users. They will then attract users on the other side who are interested in interacting with them.
4. The marquee strategy - Incentivize key users to join the platform, for example through benefits or cash payments.
5. The single-side strategy - create a business which benefits only one type of users and then start attracting another type of users to convert it into a platform.
6. The producer evangelism strategy - create a platform for producers who will later attract consumers.
7. The big-bang adoption strategy - traditional push marketing strategies are used to create high interest in your platform.
8. The micro-market strategy - target a small market at first, based on for example geography or online communities with different interests, and expand later.

[299] Parker et al., *Platform Revolution*, p. 81.
[300] Parker et al., *Platform Revolution*, p. 83.
[301] Parker et al., *Platform Revolution*, p. 84-85.
[302] More extensive descriptions of each strategy can be found in Parker et al., *Platform Revolution*, pp. 89–99.

The above-mentioned strategies can be divided into four types: avoiding the chicken-or-egg problem altogether (1), staging value creation (2, 3), designing a platform for one set of users first (4, 5, 6), and simultaneous onboarding (7, 8).[303]

A viral growth strategy can be used in combination with any of the abovementioned launch strategies to accelerate the growth of a platform. In this environment, viral growth is a process through which users encourage other users to engage with the platform. This enables the network on the platform to drive its own growth. To enable viral growth, there are four key elements to consider: the sender, the recipient, the value unit, and the external network.

The *sender* is the user creating value on a platform, such as an Instagram user sharing an image. When the sender shares their creation, they also indirectly generate attention for the platform it is created and/or shared on. The *recipient* is the user receiving the creations, for example seeing an image on Instagram. Recipients respond to content if they find it interesting or enjoyable, actions which platforms want. Therefore, enabling the creation of good content, for example by providing image editing tools on a platform for image sharing, is a smart strategic move in enabling growth. As has been mentioned, the *value unit* is an embodiment of what can be done by users on a platform and demonstrates the value of the platform. To make it possible for the value unit to spread the content created on a platform, it needs to be spreadable. A value unit is considered to be spreadable if it helps to start interactions between users on a platform. Not all value units create this opportunity, and the managers of platforms which have non-spreadable value units might need to find other ways of growing than through viral growth. The *external networks* are the networks surrounding a platform, which can be leveraged to facilitate growth. An example is how Instagram connected itself to Facebook by allowing users to share images on either or both platforms right from the Instagram application. The external networks often introduce restrictions, such as what platform content is allowed to be shared. This means that platform managers should carefully consider what external networks to leverage to create value for the users.[304]

5.6.2 Analysis of Applicability on Web 3.0

Just as platforms, dApps need to consider how to launch to best attract users to the platform, and, if they can be considered to be two-sided, still need to overcome the chicken and egg-problem. Therefore, a lot of the considerations and suggested strategies will be the same or very

[303] The numbers in parenthesis connect the categories with the strategies above. Though some of the strategies overlap between the categories, we have chosen the category which we believe is the most prevalent for each strategy.
[304] Parker et al., *Platform Revolution*, pp. 99–104.

similar when launching a dApp. However, there is an added element which can be used to further facilitate both the launch, but also the encouragement of user interaction: tokens. As has been explained above, tokenization can capture value which otherwise usually is difficult to capture. They can be used as rewards, as means of voting, as currency, and much more within the dApp ecosystem. There can be different tokens, representing different values or aimed at different user groups. Also, as tokens are possible to own, store and transact, they actually represent a value which can be transferred from the dApp to other dApps or exchanged for money or other types of currency. A great example of a common launch strategy is the Initial Coin Offering (ICO), through which users are offered tokens in exchange for funding the development and launch of a dApp. Tokens issued in ICOs can represent some kind of utility in the future dApp, or stakes in the project or the dApp.[305]

By offering tokens in exchange for interaction, dApps can incentivize users to join despite a lack of users in the other needed user groups. It can also increase their commitment to the platform. This can be seen either as a launch strategy on its own, or as a sub-category to the staging of value creation or simultaneous onboarding. Since the tokens can be taken from the dApp, the chicken or egg-problem is less of an issue. Users can invest their time and attention in a dApp, before they can use the main service it is supposed to offer, but still be rewarded for it. To further reduce the effect of the chicken or egg-problem, early adopters can be offered "cheaper" or limited-edition tokens, to incentivize early commitment. This strategy is used by Dtravel, which offers "early-bird tokens" to people adopting the dApp first.[306]

Having listed all of the benefits of launching a dApp with a token, it is easy to see why many use this type of strategy. The strategy has gotten somewhat of a bad reputation as a lot of the ICOs have turned out to be scams or vast exaggerations of the actual end-product.[307] This does not limit the usability of the token to attract users once the dApp actually exists and is up and running. It is also important to point out that for the token to enable the mentioned benefits, it needs to be accepted as valuable on a market. Even though the technology ensures the transactability of a token, that has limited effect if there is no market for it. Establishing an interest in a token, or using an already established one, is therefore key if it is to be used as part of a launch strategy.[308]

[305] Frankenfield, J., *Initial Coin Offering (ICO)*, Investopedia, 03/01/2022 (12/06/2022) https://www.investopedia.com/terms/i/initial-coin-offering-ico.asp.
[306] Dtravel Whitepaper.
[307] Telos Feed, *Why Hasn't DApp's Success Reached the Moon?*.
[308] Telos Feed, *Why Hasn't DApp's Success Reached the Moon?*.

Another type of launch strategy, which has been mentioned above, is launching as a centralized application. This strategy is comparable to the follow-the-rabbit strategy. As a platform can launch after establishing a non-platform business, dApps can launch a centralized business, a cApp if you will, to establish a presence and some stability before transitioning towards decentralization. This strategy is also used by Dtravel.[309]

5.6.2.1 Novelty and Complexity

Zooming out from the Platform Revolution Framework for a while, an interesting aspect of the sample dApps resemblance to the web 2.0 platform equivalents, is the two dimensions proposed by Marco Iansiti and Karim R. Lakhani to affect the adoption and evolution of new technology and its applications: *novelty* and *complexity*.[310] They argue that a higher degree of novelty in the technology and use case will make it more difficult to establish, since the potential users will not understand what it is about. Complexity, in terms of the coordination needed to establish the technology among a beneficial number of users, matters. If the needed user base is large and diverse, the implementation will be more difficult. Hence, this is closely related to network effects.

Apart from the obvious tactic to piggyback on the already huge and established platforms in web 2.0, one can imagine that the foundational teams of the dApps exemplified in this thesis thought that lowering the novelty bar by imitating similar platforms of web 2.0 would be a good way to attract users that do not know what web 3.0 is. By focusing the marketing on decentralization, ownership and privacy, the "problem" that the web 3.0 sphere solves is obvious and graspable.

5.6.3 Conclusions

Same

- *Chicken and egg-problem*
    - *Two-sided platforms*: As long as a dApp has multiple user groups, it will have to cope with the chicken and egg-problem.
    - *Strategies*: While the chicken and egg-problem exists on dApps the same or very similar launch strategies will be needed when launching a dApp as when launching a platform. A commonly used strategy is piggybacking, used by all of the sample dApps when creating a version of an already existing service.

[309] Dtravel Whitepaper.
[310] Iansti, M. and Lakhani, K. R., *The Truth About Blockchain*, Harvard Business Review [electronic version], Magazine January–February 2017 (12/06/2022) https://hbr.org/2017/01/the-truth-about-blockchain.

Different

- *Tokens*
    - *Reducing the chicken and egg-problem*: The use of tokens can incentivize users to join and participate on a platform, despite a lower number of users in the other user groups.
    - *Strategy*: Establishing an interest in a token, or using an already established one, is key if it is to be helpful as part of a launch strategy.
- *Additional strategies*
    - *ICO*: Offering tokens as a means of funding the creation and launch of a dApp.
    - *Launching a cApp*: Establishing stability before taking on the challenge of decentralized governance.

5.7 Metrics: Measuring Relevant Aspects

5.7.1 Presentation of Theory in Relation to Web 2.0

Key to keeping track of the development and success of any business is the ability to identify and track certain metrics, but since the traditional company metrics, such as inventory turns and cash flow, are not necessarily applicable in the same way on platform networks, new metrics need to be identified. While traditional company metrics measure the efficiency of value flows through the production pipeline, the goal of platform metrics should be to measure the rate of interaction success and the factors which contribute to it, in accordance with what creates value in the different business models.[311] On platforms, transactions and interactions indicate that the users and participants are finding what they are looking for. Parker et al. suggests that the main metrics for a platform business should therefore be the *level of activity*, in the shape of purposeful interactions, through the identification of *facilitating factors* for interactions.[312] Looking into these metrics, the platform owner should be able to track *positive network effects* as well as where and how *value creation of platform participants* take place.[313] Conclusively, platform owners need to monitor how value is created and distributed over the whole ecosystem.

[311] Parker et al., *Platform Revolution*, pp. 184–186.
[312] Parker et al., *Platform Revolution*, pp. 185–186.
[313] Parker et al., *Platform Revolution*, pp. 187.

5.7.1.1 Focusing and Adopting the Metrics

The core interaction should of course be the focus then designing relevant metrics. Other than that, interactions should be measured with respect to the in-detail needs of a particular platform.[314] But even though the metrics designed for a certain platform can be very fine tuned and complex, they need to be simplified to be effective. According to Eric Reis, this could be achieved through the metrics being *actionable*, *accessible,* and *auditable* ('the 3 A's test').[315]

To ensure that appropriate metrics are used, it is important to adapt the metrics and let them evolve along with the platform life cycle. Different aspects indicate success depending on a platform's development stages. Consequently, the start-up phase should focus on basic factors such as percentage of successful interaction based on the amount of users, if the curating and design facilitates good matching and if the risk is evenly allocated on both sides of the core interaction.[316] The metrics in the growth phase should be about using network effects to facilitate core interactions and balancing both sides.[317] When the platform reaches a mature state, it should focus on ensuring that the core interaction still produces value, but also seek to adapt to market needs through innovation and allocate resources in the ecosystem.[318]

5.7.2 Analysis of Applicability on Web 3.0

Naturally, measuring and keeping track of metrics will be an important activity for dApps as well. Just like there is a difference in what is measured in traditional pipeline businesses versus platform businesses, we predict that dApps will need to reevaluate what metrics to consider as well. As the web 3.0 environment is still quite new, there are few well-established dApps to draw inspiration from. Since two of our sample dApps are not yet released we struggle to find information about measuring success. Our best bet is to look at DTube and Minds, which have been launched for a while.

To some extent, we believe that the dApps will follow the same logic as the platforms on web 2.0. However, the logic will not be completely the same – due to key differences in the business models. The fast and continuous development of the technology also increases the risk that new metrics are just around the corner. Hence, we will merely be able to discuss aspects to measure based on our observations.[319] One thing which will remain useful for measuring is the

[314] See further Parker et al., *Platform Revolution*, pp. 194.
[315] Parker et al., *Platform Revolution*, pp. 201–202.
[316] Parker et al., *Platform Revolution*, pp. 189–194.
[317] Parker et al., *Platform Revolution*, pp. 195–197.
[318] Parker et al., *Platform Revolution*, pp. 199–200.
[319] Since we focus on web 3.0 and dApps, we will not go further into suggesting and analyzing metrics for particular blockchains. However, there are other proposals out there made by members of the crypto community. We believe one of the better suggestions being the one by the Fabric Ventures partner Max Mersch, in *An Overview of Relevant Metrics in Web 3.0,*

3 A's test. The metrics to assess the variables discussed below should therefore be actionable, accessible, and auditable.

5.7.2.1 User Adoption

First of all, in this stage of web 3.0 *user adoption* is a core goal of every dApp, but also the web 3.0 movement which all dApps are part of. There should be an interest of every dApp to dominate the adoption stage by catching and absorbing early adopters. Measuring user adoption can be done by keeping track of the number of transactions and interactions which are performed on the dApp. That number can, just like on web 2.0 platforms, be related to the number of users accessing the dApp to find an average interaction rate. DTube also measures performance by geographical market reach, accounts and created and unique visitors.[320]

Since the dApps are also part of the work of making web users convert from web 2.0 environment to the web 3.0 environment, it would benefit from measuring this somehow as well. We have identified struggles with interoperability, friction of entry and possibly some of the means to improve conversion – for example creating interoperability through technical solutions as well as wallet compatibility and tokenization to lower the threshold for entry – but finding metrics to measure it is more difficult.

A higher interaction rate means that the user investments – in terms of time, attention, and data – in the dApp will be higher, as well as the level of dedication, and the stabilization of the dApp's and the dApp token's market status. As has been established, the increased use of a dApp's token also enforces the value and stability of both the token and the application.[321] Thanks to the transparency of the blockchain, adoption of the token could be measured by reviewing its transaction history and counting the number of separate accounts that the token has been transacted to. We found one example in Minds measuring traction and adoption by the metrics: Token Holders; Total Transactions; Total Volume; Tokens Rewarded; and Tokens Reclaimed – on- and off chain.[322] A way to measure interoperability and adoption could be (if it is possible) to track connections between smart contracts, kind of like how citations are tracked in relation to published research.

Fabric Ventures, Medium, 09/07/2019 (27/05/2022) https://medium.com/fabric-ventures/an-overview-of-relevant-metrics-in-web-3-0-b213f7e641ac.

[320] DTube White Paper.

[321] See also the comparison to the DAO tokenization logic in Shuttleworth, *What Is A DAO And How Do They Work?*: "A healthy, robust protocol will garner more usage, and in turn, increase the value of the tokens of which each DAO member is in possession of. So as the protocol succeeds, so do the token holders."

[322] Minds Whitepaper.

5.7.2.2 Value of the Token

Obviously, an interesting aspect would be to review the market value of the token connected to the dApp. However, due to the volatility of the crypto market in general, a more important metric would be the spending patterns of a token as that would be a more accurate indication of its establishment. This would entail to what degree the users are transacting the dApp's token on the dApp itself, in other dApps (and if so, which ones), and in marketplaces for tokens?[323] Here, Minds measures liquidity and mining through Uniswap.[324]

5.7.2.3 Privacy and Metrics

Some of the aspects suggested for the measuring of success above require some kind of surveillance actions. We want to point out that these kinds of measuring methods could violate one of the main selling points of both web 3.0 and the blockchain technology itself – privacy. If tokens are used as tools for measuring, they are inevitably connected to certain users, which results in traceability of the users' activities. At the same time, the users can be anonymous when engaging in on-chain activities. This is a clear example of how the value of data is reduced through anonymization, as it removes some of the data that can be used for analysis.[325]

5.7.2.4 Decentralization

It is also interesting to measure the degree of *decentralization* among the users and participants on the dApp. This should of course be analyzed in relation to the dApp's business model. Decentralization also serves a security and safety function, and one of the main selling points of web 3.0 is its reliability. Hence, to measure the level of both architectural and political decentralization and its ability to mitigate risks towards the dApp users could also be a way to measure dApp success. To do so, one should arguably use the axes proposed by Buterin or the simpler version by Wenger, as described in Section 3.1.2.2 *Decentralization*.

As has been explained, even if a dApp is decentralized, a single or a few user(s) can hold enough tokens to have the governance power over it in practice. This is, of course, only the case if the tokens can be used to vote on decisions or represent shares in the dApp. Such a metric is

[323] Compare to the metric social signal suggested by dapp.com, addressing the correlation between a project's on-chain performance and its token price, dapp.com, *Social Signal, A New Metric as Your Crypto Trading Signal*, Medium, 06/11/2020 (27/05/2022) https://medium.com/dapp-com/social-signal-a-new-metric-as-your-crypto-trading-signal-57a3a85a6f78.
[324] Minds Whitepaper.
[325] See for example Martens, Bertin, *An economic perspective on data and platform market power*, JRC Digital Economy Working Paper 2020-09, JRC122896, p. 4.

interesting if the dApp wants to make sure it is decentralized and aligns with the ideology of web 3.0, but also to keep track of whether there is a likelihood of a hostile takeover.[326]

5.7.3 Conclusions

Same

- *General*: To a large extent, we believe that the metrics for dApps will follow the same logic as the platforms on web 2.0.

Different

- *General*: Since the web 3.0 environment is very new, we suggest metrics that focus on adoption, such as: *User adoption, Token adoption, Interoperability, Token value and liquidity, and Decentralization.*

5.8 Discussion

It has been stated many times in this thesis, that many of the models presented by Parker et al. in Platform Revolution will most likely be applicable to the web 3.0 environment as well. The general reasoning is often the same, but there are differences in the details which makes it so that considerations which are made in each model differ to different extents. Also, we have found that at least two of the blockchain characteristics presented in Section 3.1.2 *Blockchain* should be presented as separate models in an actual adaptation of the framework: decentralization and tokenization. Both characteristics popped up both in several models, but also in several parts of the models, as is illustrated in the figure below.

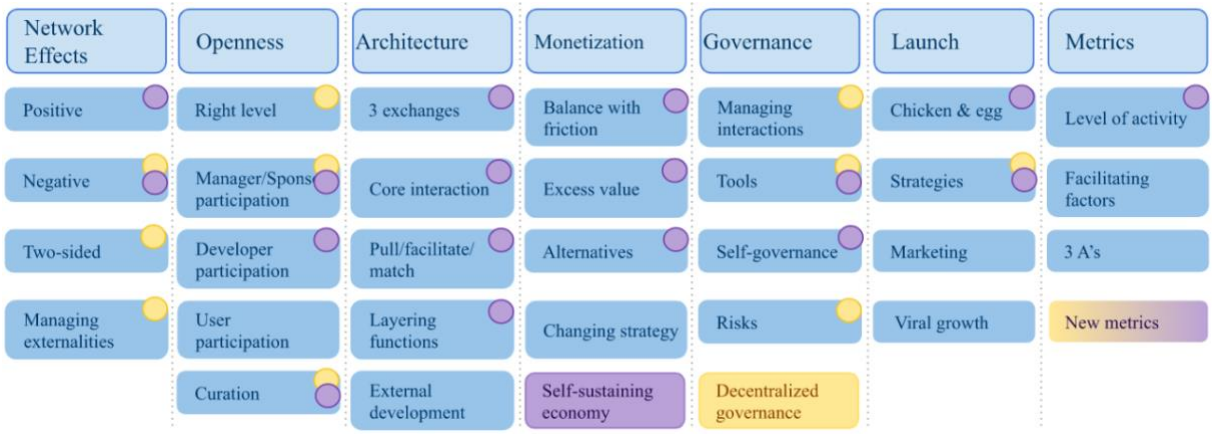

Figure 4: An illustration of where the characteristics decentralization and tokenization are present in the discussion. The yellow dots represent decentralization and the purple dots tokenization. The added boxes represent new topics which need to be discussed in the existing models.

[326] This is what happened in the Steem/Steemit hostile takeover mentioned above.

5.8.1 A Need for a Decentralization Model

When starting this project, we thought decentralization was the key aspect to study since we felt hesitant about the common statements saying that decentralization would revolutionize the web. We could see that dApps and applications claiming to be decentralized had what seemed to be an in-practice-centralized governance structure and wondered if the web 3.0 was really so special after all. Our expectations have been confirmed to some extent, as it is still up to each project to decide to what extent and on what parameters the (d)App should be decentralized. The dApp can be fully centralized while running on a decentralized protocol. This does not remove the fact that the level of decentralization is indeed an important strategic decision to make, not least for the usability and adoption of this technology.

The creation of a usable model in relation to decentralization will demand extensive knowledge in relation to for example economic, political, and technical theory, as well as ideas of the decentralization concept. Creating the model itself falls outside the scope of the thesis as defined in the introductory chapter. It is also not reasonable due to constraints in time and knowledge. However, we do want to point out that *Ostrom's theory of governance of the commons* can be of use. We made an attempt to apply the framework and concluded that the protocol of a dApp could be considered a public good. As we are focusing on the dApps from a business perspective, we decided such technically focused considerations (which also were not extensively discussed in Parker et al.,) fell outside of the scope of this thesis.

5.8.2 A Need for a Tokenization Model

During this project it has become increasingly clear that aside from decentralization, there is also the *allocation of ownership through tokenization* that distinguishes web 3.0 from web 2.0. We believe the popular saying that while web 2.0 was about reading and writing, web 3.0 is about reading, writing, and *owning*, is very accurate, putting a third dimension to the web to legitimize the "3.0".[327] Therefore, we believe *tokenization* is a second key through which it is possible to identify the gaps in the Platform Revolution framework when applied to web 3.0. As it has been a constant consideration in the analysis of all the models investigated in different ways, we believe this should also constitute a new separate model in the Platform Revolution framework when adapted for web 3.0 dApps.

A richly illustrated model of how the incentive structure and tokenomic systems work is beyond both our competence and the scope of the thesis as defined in Section 1.6 *Delimitations*.

[327]Stevens, R., *What Is Web 3 and Why Is Everyone Talking About It?*, CoinDesk, 18/05/2022 (12/06/2022) https://www.coindesk.com/learn/what-is-web-3-and-why-is-everyone-talking-about-it/.

However, the subject of tokenization has been recurring to such an extent that we found some value in addressing deeper than the decentralization model. We do want to point out that this discussion merely brings up tokenization and the potential considerations in a framework in relation to how it has been discussed in the thesis. We do not claim to provide an exhaustive record of all tokenization aspects that should be considered, nor the most important ones, but only the ones we have encountered and found most clear and important during the thesis work.

5.8.2.1 Tokenization

The most apparent purpose of a token is its utility and how it is perceived as valuable within the web 3.0 community. It also has the advantages of being rather easy to grasp and use and enables flexibility and creativity in the creation of value structures in the economic models of a dApp. It can be used for everything from gamification strategies to more strictly theoretical economic business strategies. For example, the strategies of DTube and Dtravel are completely different as the Dtravel dApp treats the tokens as actual real-world money, while DTube focuses on the social aspects of facilitating a reward and curation system.

From a dApp business design perspective, tokenization is furthermore seductive in the sense that it enables the *capturing of value that would otherwise not be captured* – excess value. For example, tokenization makes it possible to *objectify the attention, commitment, content creation* on both/all sides of the interaction on the platforms.

The tokenization can *both increase and decrease the friction of entry*. For a less knowledgeable user, the tokenization system can seem complicated and discouraging. The technology adds another layer of complexity. On the contrary, to a more knowledgeable user, the tokenization system might lower the barrier of entry. It can be attractive enough for the user to engage in the dApp, and since additional value can be acquired by the user when engaging on the platform the accepted friction level might be higher. An additional use of tokens in relation to facilitating user attraction is the possibility of limiting the chicken and egg-problem. Users in one group can benefit from tokens on a dApp before the actual value unit can be properly offered (as there is yet to be a large number of users in the other group), they are more likely to participate on the dApp despite the limit in its usability.

Tokenization is also usable as a *governance tool* of the platform. This is one of the most prominent showcases of its usability. Dtravel also uses the token system for dispute resolution, through a Support-to-Earn approach.[328] Both DTube and Minds use it for content curation with

[328] Dtravel Whitepaper.

the help of the platform users.[329] It is also a method for both distributing the value created on the dApp fairly, and to facilitate transparency in the value allocation, which are both key principles according to Parker et al. This should encourage innovation and problem solving on the platform and the management of externalities.

Other important findings include the role of tokens as a *fourth key exchange* which should be facilitated in the interactions on a dApp, together with the exchange of information, goods and services, and currency. Tokens as a fourth element in the core interaction of a dApp is also an adaptation of the framework which we find to be very interesting to investigate further. Furthermore, the additional sources of value which can be created using NFT tokens can make up important parts of the strategy of a dApp. Limited edition collectibles, representing rewards or allowing access to additional functions on a dApp, can quite easily be created and sold or distributed in the community. The risk of such actions is limited as the cost does not need to be large, but the potential value in terms of increased interactions or publicity can be high.

To fully enjoy the benefits of the value created through tokenization, the dApp should enable interoperability. This makes the tokens tradable on marketplaces and usable on other dApps on the same protocol. It also encourages external developers to contribute to the dApp. As of today, the tokens also play a huge part in assessing the success and prospects of the dApp, since token allocation is an easy way to measure adoption – one of the key goals of the whole web 3.0 community at this point in time.

6 Conclusion

Most of the web 3.0 and blockchain theory is brought into the framework through adaptations of existing models. However, two characteristics are of such importance to web 3.0 and dApp business models, that they are more suitably expressed as new, separate models in a framework.

6.1 Summarizing Results: Answering the Research Questions

SRQ 1: *How do the models of web 2.0 platforms translate to web 3.0 decentralized applications?*

The web 2.0 models in many cases translate quite well to the dApps. It is obvious that none of the models are superfluous – all the models which have been discussed will need to be considered in relation to dApps as well. However, the models need to be adapted to some extent

[329] Dtravel and Minds (v2) Whitepapers.

to ensure that they bring up all relevant aspects which are needed to consider when creating a business strategy for, or analyzing, dApps in the web 3.0 environment. Details on how the models should be adapted can be found in the discussion section of each model chapter or summarized in the conclusion section succeeding it.

SRQ 2: *What additional models can be identified in web 3.0 decentralized application business models?*

The models which we find need to be added to increase the accuracy of the framework in relation to the dApps are decentralization and monetization. The reasoning behind this can be found in the Section 5.8 *Discussion* above.

Main Research Question: *What models should be included in a framework for analyzing web 3.0 decentralized applications?*

To summarize, to accurately describe and analyze dApps, a DApp Revolution framework needs to include the adapted versions of the models network effects, openness, architecture, monetization, governance, launch, metrics, as well as the added models decentralization, and tokenization. The parts of the models which should be adapted and suggestions of additional parts to include can be found in Figure 5 below. In addition, policy, strategy, and disruption, as well as more in-depth discussions on metrics, should be included in a dApp applicable framework. This will be facilitated by the continued development and utilization of web 3.0.

Figure 5: An illustration of where to start when creating the DApp Revolution framework. The parts of the original seven models which remain the same or very similar are blue, the parts which need to be adapted or further discussed are blue with green markings. The green boxes show the completely new models and parts which we recommend adding to the framework.

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Appendix

Appendix I – Literature Table

Appendix II – Observation Schedule

Appendix I – Literature Table

No.	Research Area	Author/s (Year)	Title	Short Desription	Relevance	Comments
1	Platform Dynamics, Platform Framework	Parker, Geoffrey G.; Van Alstyne, Marshall W.; Choudary, Sangeet Paul (2021)	*Platform Revolution: How Networked Markets Are Transforming the Economy—and How to Make Them Work for You*	Building on the canon of economic and business management theory, and the authors own research, Platform Revolution book formulates a framework for "(...) how to start and run a successful platform business, explaining ways to identify prime markets and monetise networks" (Platform Revolution book cover) – examining key elements and strategies for success on the changing marketplace, characterized by firms' transitions into digital platform business models. The book provides a solid review of success factors of platforms currently dominating the digital platform market as well as the onew up and coming.	The framework presented in Platform Revolution is the foundation of the entire thesis. We create a simplified version of the framework and test its applicability to web 3.0 dApps by applying blockchain theory. Subsequently, we suggest adaptations of the framework to fit the emerging web 3.0 landscape.	Based on Academic Research (Geoffrey G. Parker: Professor of engineering at the Thayer School of Dartmouth College; Marshall W. Alstyne: Professor at Boston University and research associate at the MIT Initiative on the Digital Economy; Sangeet Paul Choudary: Entrepreneur-in-Residence at the INSEAD Business School; Co-chair of the MIT Platform Strategy Summit, MIT Media Lab); Captures a body of established economic and business theory
2	Blockchain, dApps, Web 3.0	Tapscott, Don and Tapscott, Alex (2018)	*Blockchain Revolution: How the Technology Behind Bitcoin and Other Cryptocurrencies Is Changing the World*	The book presents the blockchain technology and how it can be utilized in business models. Using made up examples of web 3.0 decentralized alternatives of existing web 2.0 platforms, the book illustrates one view of what the blockchain technology can enable when it comes to business management.	Used to get an understanding of the web 3.0 characteristics, and how they can affect business models.	Popular Science (Don Tapscott, Executive Chairman of the Blockchain Research Institute, Adjunct Professor at INSEAD and Chancellor of Trent University in Ontario; Alex Tapscott: globally-recognized writer, speaker, investor and advisor focused on the impact of emerging technologies, such as blockchain and cryptocurrencies, on business, society and government.)
3	Blockchain, Web 3.0	Ragnedda, Massimo and Destefanis, Guiseppe (Edited by) (2021)	*Blockchain and Web 3.0: Social, Economic, and Technological Challenges*	A collection of research papers from a variety of disciplinary settings. Explaines how such the blockchain and other web 3.0 technologies are disruptive and comparatively examines the social, economic, technological, and legal consequences of the disruptions.	Used to learn more about web 3.0 and the blockchain technology, triangulate the blockchain information found online, and to find more perspectives which could be applied in the adaptation of the framework.	Based on academic research (Massimo Ragnedda: senior lecturer in mass communication at Northumbria University, Newcastle, UK; Giuseppe Destefanis: lecturer in the Department of Computer Science at Brunel University, UK.)
4	Law in Technology, Code as Law	Lessig, Lawrence (1999)	*Code and Other Laws of Cyberspace*	The book analyzes and elaborates on the proposed four elements of cyberspace governance (Laws, Norms, Architecture, and Markets) and their impact on society resembling the one provided by legislation forumlated by governments.	It is one of the foundational theorethical frameworks of the Platform Revolution model for platform governance. It it used to a limited extent for the inclusion of more perspectives and broaden our understanding of the development of both the internet and the blockchain technology based governance.	Based on academic research (Lawrence Lessig: the Roy L. Furman Professor of Law and Leadership at Harvard Law School; Political activist); Read together with the sunsequent edition, *Code:Version 2.0* which focuses mainly of regulatory instruments of governments with regard to the web.
5	Blockchain, Antitrust	Schrepel, Thibault (2021)	*Blockchain + Antitrust: The Decentralization Formula*	The primary objective of the book, as to our understanding, is to address legal antitrust issues related to the development of blockchain technology and the entailing business structures emerging, which is not the topic of sour thesis. However, the work also provides a dense description on both the blockchain technology itself and the elements characterizing web 3.0 (decentralizatoin, distribution, public permissionless blockchains, consensus mechanisms etc.).	The work is being used for the purposes of understanding the multilayered and complex nature of blockchain based landscapes that we are trying to analyze.	Based on academic research (Thibault Schrepel: Associate Professor of Law at VU Amsterdam; Faculty Affiliate at Stanford University's CodeX Center)

6	Blockchain, Governance, Trust	Werbach, Kevin (2018)	*The Blockchain and the New Architecture of Trust*	The work addresses the importance of trust in the technological governing structures that is implemented or emerging in the blockchain space, and explains the role and importance of code and other architectural elements. The author also presents the opinion that the blockchain space needs to adapt to law and real world government structures in order to become accepten and adopted as a mainstream technology.	The work is used to deepen our understanding on key blockchain elements, such as decentralization governancce, the technological architecture and the implications on the market dynamics that we are trying to understand and define.	Based on academic research (Kevin Werbach: Professor of Legal Studies and Business Ethics; The Wharton School of the University of Pennsylvania)
7	Business, Research, Methods	Bell, Emma, Bryman, Alan, and Harley, Bill (2019)	*Business Research Methods*	The book gives a great overview of different approaches to writing a thesis. It presents different methods, explains the implications of different choices, and how to critically evaluate the work performed. It also explains the importance of formulating research questions and choosing suitable methods to answer them.	The work is used to define the relationship between theory and method, as well as the research strategy, design, and method. It is also used to define the research quality dimensions which need to be considered in relation to the chosen strategy, design and method.	Based on academic research (Emma Bell: Professor of Organisation Studies at The Open University; Bill Harley: Professor of Management and Marketing at University of Melbourne; Alan Bryman: Professor of Organizational and Social Research at University of Leicester (formerly))
8	Blockchain, Ethereum, Developing, dApps	Palladino, Santiago (2019)	*Ethereum for Web Developers: Learn to Build Web Applications on top of the Ethereum Blockchain*	The work is a hands-on practical developer guide to building decentralized applications for web 3.0, focusing not on the blockchain layer, but on the web application layer.	The work is used to explain aspects of dApps and how they interact with the blockchain and to understandand and problematize decentralization from a technical and user centered perspective.	Not based on academic research (Santiago Palladino: Ethereum developer at OpenZeppelin; M.Sc. in ComputerScience; University of Buenos Aires)

Literature Table (Articles)

No.	Research Area	Author/s (Year)	Title	Short Desription	Relevance	Comments
1	Market design; Governance; Market failures	Roth, Alvin E. (2007)	*The Art of Designing Markets*	The article elaborates on the importance of designing markets in order to avoid market failures. The author proposes three things that a market needs to do to function: Create of *ticknes*, provide *safety* and prevent *congestion*. He also discusses computers, digitalization and them enabling so-called "smart markets".	The article is referred to by Parker et al. in the chapter on platform governance, where the authors combine Roth's theory with the one by Lawrence Lessig on norms, law, architecture and markets as the governing elements. In the thesis, it isused to further understand the keys to a well-functioning governance of a web 3.0 dApp.	Published in Harvard Business Review, republished electronically at https://hbr.org/2007/10/the-art-of-designing-markets (12/06/2022) Alvin E. Roth: The George Gund Professor of Economics, Harvard University, Cambridge, Massachusetts and the George Gund Professor of Economics and Business Administration, Harvard Business School, Boston.
2	Web 2.0, development of internet	Levy, Moria (2007)	*WEB 2.0 implications on knowledge management*	Exploring the Web 2.0 issues and implications on knowledge management, the paper lists principles and characteristics of web 2.0 and discusses what parts are different when comparing to web 1.0.	Used to understand web 2.0 and to find inspiration on how to look at web 3.0.	Published in Journal of Knowledge Management: Vol. 13 No. 1 2009, pp. 120-134, Emerald Group Publishing Limited. Moria Levy: Doctor of Philosophy, Professor at the Department of Information Science, Bar Ilan University.
3	Web 3.0, Technology management, Automatization, Intormation Generation	Rudman, Riaan; Rikus, Bruwer (2016)	*Defining Web 3.0: Opportunities and Challenges*	The article addresses the development from web 1.0 to web 3.0 and the general role of technology in e.g. business operations. The authors stresses the importance of not viewing web 3.0 in isolation, but rather treat it as a new embodiment of already existing dynamics and principles. According to them, the technology poses both new advantages, where for example automatization in information creation and processing will increase efficiency and accuracy. On the other hand, the authors suggests that the same automatization will decrease security.	Used to exemplify the importance of technology and automatization on web 3.0. However, the article is from 2016 and does not describe web 3.0 as we know it and has therefore not been used to further exent.	Published in The Electronic Library: Digital information organization and use, Vol. 34, no. 1, 2016: pp.132–54, Oxford: Emerald Group Publishing Limited. Riaan Rudman: Professor and Senior Lecturer in Auditing, University of University, South Africa. Bruwer Rikus: Chartered Accountant and previously lecturer at the University of Stellenbosch, South Africa.
4	Blockchain, Technology, Contracts, Innovation, Complexity and Novelty	Iansti, Macro; Lakhani, Karim, R. (2017)	*The Truth about Blockchain*	The authors investigate and present what path the blockchain technology is likely to follow. They also present aspects which firms should keep in mind when investing in the technology.	Used in relation to launch, presenting two dimensions (novelty and complexity) which should be considered in the adoption and evolution of innovation.	Published in Harvard Business Review: January–February 2017 issue (pp.118–127). Marco Iansiti: David Sarnoff Professor of Business Administration at Harvard Business School, heading the Technology and Operations Management Unit and the Digital Initiative. Karim R. Lakhani: Charles Edward Wilson Professor of Business Administration, Dorothy and Michael Hintze Fellow at Harvard Business School, founder and codirector of the Laboratory for Innovation Science at Harvard.

Appendix II – Observation Schedule

* Please note that we have to an as large extent as possible used direct citations from the websites and white papers of the sample dApps for the sake of transparency. Where no explicit information has been possible to find, we have made notes on our observations (presented without citation marks).

		DTravel	Drife	DTube	Minds	
GENERAL	**Website**	https://dtravel.com/ https://tryl.com/	https://www.drife.io/	https://d.tube/	https://www.minds.com/	**Website**
	Service offered	Home sharing	Ride sharing	Video sharing	Social media	**Service offered**
	Web 2.0 equivalent	Airbnb	Uber	YouTube	Facebook/Twitter	**Web 2.0 equivalent**
	Launched	No	No	Yes	Yes	**Launched**
	White paper	https://whitepaper.dtravel.com/	https://whitepaper.drife.io/	https://token.d.tube/whitepaper.pdf	https://cdn-assets.minds.com/front/dist/en/assets/documents/Whitepaper-v0.5.pdf	**White paper**
	Blockchain	BNB Smart Chain (EVM compatible)	AEternity/BNB Smart Chain	DTube Chain built on Avalon (EVM-compatible)	Ethereum	**Blockchain**
	Purpose and goal	*"Support the **community**" *"[A] true **marketplace** for home sharing that brings together hosts and guests, minimizing and decentralizing intermediation between them" *"Dtravel has audacious goals to become one of the largest DAOs operating outside of the crypto-native economy."	*"Drife aspires to **disrupt** the existing business model and to create a **fairer**, more efficient and **transparent** ride-hailing economy and **decentralized** mobility marketplace."	*"Our objective is to give social media **users** a tool to **get back the control over the value** and the content they create." *"User respect, Human empowerment, **Transparency**, **Fairness**"	*"Minds is an **open source** social network dedicated to Internet freedom. Speak freely, **protect your privacy**, **earn crypto rewards** and **take back control** of your social media." (https://www.minds.com/) *"We are on a mission to elevate global discourse through **Internet freedom**. Internet freedom means: Free speech, Privacy, Open source, Self-sovereignty, Community governance, Crypto economy" *"Our goal is to build a new model for content creators to take back their Internet freedom, revenue and social reach."	**Purpose and goal**
	Means to purpose and goal	*"Create the TRVL Token, a **utility token** to drive the community's economy" *"Establish the DTravel DAO, a Decentralized Autonomous Organization **governed by TRVL token holders**, including hosts and guests"	*No commission - charge **subscription fee** instead ***Market-dictated pricing** - optimizing pricing with no middleman interest ***Transparency** and **freedom to choose** - choose riders/drivers *Open governance - **NFT franchise model** *Incentivized participation - **token rewards**	***User curation** through tokens ***Rewards** through tokens, generating value in DTC ***Open source** *Blockchain technology for **privacy**	*Build out the software and infrastructure to **scale** as an open source social network powered by a digital reward system. *Minds **contribution economy** ***Sustainable reward system** leveraged by an online community	**Means to purpose and goal**
	Main selling-point (s)	*"Your business **without intermediaries**." ***Decentralized**, **autonomous**, **community owned**" *"Travel, Loyalty, Protection and Governance" through **ownership** *"DTravel's **effective total fees are significantly lower** than competing home-sharing platforms' published fees of up to 20%. *DTravel is committed to full **transparency** of its fees. *All fees are used to fund the Dtravel DAO, and thus are ultimately under the control of the community and exist to **benefit the community**."	*"**Disrupt** the existing business model" *"Create a **fairer**, more efficient and **transparent** ride-hailing economy and **decentralized** mobility marketplace." *"The **platform** for the driver and the rider" *"Eliminate excessive transaction fees, **reduce censorship** (reduce interference from the Drife side) and **redistribute value** back to the community while enhancing **transparency**." *"A zero-commission structure leads to **better incomes for drivers**, who, in turn, can pass on some of these benefits to the riders who save on commuting costs. So the Drife platform eventually becomes a platform that provides high incomes to drivers and economic incentives (in the form of savings) to riders as well."	*"This situation creates the need for a new model that respects user **privacy**, can **self-moderate** content in an effective way **without censorship** which creates **trust** for all stakeholders." *"User respect; Human empowerment; **Transparency**, **Fairness**" *"Our objective is to give social media users a tool to **get back the control over the value** and the content they create."	*"The value in a social network lies in its community. You **deserve** to be **rewarded for your contribution** to the success and growth of the network. Minds rewards you with MINDS Tokens (ERC-20) every day for creating popular content, referring friends or providing liquidity. The tokens can then be used to promote your content (1 token = 1,000 impressions) or send tips to content creators to show your support and unlock special perks."	**Main selling-point(s)**
	Why use blockchain	"**cryptocurrencies** for payments, **smart contracts** to automate its operations, **tokenomics** and **decentralized governance** to align the interests of hosts and guests and reduce tensions"	*The use of a blockchain enables **trustlessness** by leveraging programmable automated self-executing smart contracts. It also enables riders to directly connect with drivers through a decentralized platform, and since there is no middleman charging per transaction, the transaction costs can be reduced.	*"We designed Avalon social blockchain, a new socio-economic model for social medias based on our manifest. We built this new model on 2 principles: Re-create **trust** with users by leveraging the power of maturing decentralized technologies; **Reward** users for their contributions in a fair way with cryptocurrency tokens"	***Decentralized development** ***Decentralized payment** ***Peer-to-peer monetization** ***Tokenized** reward system	**Why use blockchain**
WEB 3.0 CHARACTERISTICS	**Token**	*TRVL (native of DTravel) ***NFT** for premium membership	*DRF *FNTF	DTube Coin (DTC), Voting Power (VP)	ETH - The Minds token is a social networking **utility** built upon the **Ethereum ERC-20** standard. Minds chose to issue its tokens on the Ethereum network because it is the leading open source, general purpose blockchain optimized for smart contracts.	**Token**
	Token purpose	*4 purposes: "travel, loyalty, protection and governance."	*"This will eventually transform the way we attract, engage, reward, and retain customers in ways never before possible for a ride-hailing platform." *FNFT - Enable **franchising**	Curation, trading, network effects, scaling, adoption	***Rewards** for producing or reacting to content, developing code, beta-testing, early adoption, suggesting improvements, and referrals ***Boosting content** ***Vote** on development	**Token purpose**
	Decentralization - Logical - Political - Architectural	***Public permissionless blockchain** ***"Dtravel DAO** will have a **Representative Council,** with members elected by TRVL holders (including hosts and guests who choose to participate)." *"Dtravel encourages **community participation** by **rewarding activities of various types** within the Dtravel economy, creating opportunities for members to be rewarded in TRVL for their time and effort. To ensure that these activities are performed by participants whose interests are **aligned with the interests of the wider Dtravel community**, participation is often exclusive to TRVL token holders who have allocated a minimum amount of TRVL." *"We commissioned an **independent, third party audit** of our smart contracts." (Report: https://github.com/peckshield/publications/blob/master/audit_reports/PeckShield-Audit-Report-ERC20-TRVL-v1.0.pdf)	*AEternity/BNB Smart chain are both **public and permissionless blockchains.** ***"Open governance:** At Drife, we are not just creating a platform for service providers and receivers; we are creating a **self-sustaining** ecosystem where every stakeholder plays a vital role in its growth and healthy maintenance. Drife is built with the philosophy that one centralized network operator cannot know what is better for a region than its local community. For this purpose, Drife brings in a franchise model to **decentralise operations** of the platform across various locations of the world. By participating in this unique NFT based franchise model, entities like riders, drivers, fleet owners, and local transportation and logistics companies can govern themselves in the most efficient and fair way." *Drife Foundation - no information on who/what it is	*"Blockchain, decentralized infrastructures and **open source software** can re-create **trust** by offering data **immutability** (this defends against censorship), **transparency** (against corruption) and **privacy** (no need to collect personal data)." *"**Uncensorable** – decentralized protocols such as **IPFS** (InterPlanetary File System), **WebTorrent** or **DAT** offer **file hosting capabilities distributed** among all peers of a network. If one peer node fails, the flow is redirected to the next." *"Avalon is designed as a decentralized organization, **run by elected leaders** who decide to implement, or not, **propositions from the development team** to update any aspects of the blockchain. On Avalon, blockchain validators (miners) are called leaders and are elected by the community in real time. Any registered user can vote (or unvote) for up to 5 "leaders" at any time; The top 21 users who receive the most votes are automatically elected. Their role is to host, run the blockchain, debate about and validate with a 2/3+ majority the implementation of update proposals (forks)." *"DTube Chain is a decentralized organization governed by leaders. It is much easier to obtain a **consensus** and implement changes for the DTube community where **all stakeholders interests are aligned** rather than on Steem where more than 400 Apps share the same chain and economy, yet gave different interests and visions."	*Ethereum is a **public and permissionless blockchain** *"One of the most important elements of the Minds network is **transparency**. All of our code is **100% free and open source** which allows for rigorous **peer review, audit** and **collaboration**. Minds is attempting to build a **fair and democratic system** by tying the token distribution directly to the demand and activity of the network and by giving all users **equal opportunity** to **contribute** and **earn**. **Founders, advisors and employees of Minds are not allocated any additional supply of tokens and will be subject to the same distribution rules as the rest of the community**. Every user's vote counts for the same amount, and **every voice has equal ability to be heard**. The key for any fair economy is for everyone to have an equal chance at making it to the top. Success on Minds is measured by unique daily interaction for maximum fairness and reward integrity as opposed to other models that give the users with a higher token balance more voting power. The Ethereum blockchain is governed by the Ethereum governance compendium for all improvements, project management and technical decisions regarding the blockchain and its infrastructure."	**Decentralization - Logical - Political - Architectural**
	Token utility	*"**Pay** for bookings in a wide variety of fiat currencies and cryptocurrencies, including TRVL. Payments in TRVL are encouraged and incentivized by a guest cashback of up to 25% of the total nominal fees." *"Hosts are encouraged and **incentivized** to choose to receive payments in TRVL through a host **cashback** of up to 25% of the total nominal fees." *"Passport, Build your on-chain travel credentials" *"Earn **rewards** by staking TRVL" ***"Pledge** TRVL to support ecosystem initiatives" *"Metaverse, Explore an entirely new frontier for travel" *"Dtravel **encourages community participation** by **rewarding activities** of various types within the Dtravel economy, creating opportunities for members to be **rewarded in TRVL for their time and effort**. To ensure that these activities are performed by participants whose interests are aligned with the interests of the wider Dtravel community, participation is often exclusive to TRVL token holders who have allocated a minimum amount of TRVL." *"The primary ways to receive TRVL for loyalty at the very beginning are simple: join the Dtravel community as an early bird; help the community grow by **referring** others to Dtravel. A total of 25,000,000 TRVL will be distributed through these onboarding programs. (Early Bird Call, Referrals)" *"To promote the growth of the Dtravel community, the Dtravel DAO will be launching a series of GameFi Growth Actions funded by the Growth Fund. Members who participate in these actions will be rewarded with TRVL tokens and special NFTs." *"To **incentivize** hosts with exceptional performance to join Dtravel, this growth action will distribute TRVL to hosts who satisfy the following eligibility conditions" *"To **incentivize** guests with exceptional performance to join Dtravel, this growth action will allocate TRVL to guests who satisfy the following eligibility conditions" *"Dtravel will consider **airdrops** of TRVL to other communities that have a high synergy potential with Dtravel." *"Play-to-Earn system" *"Support-to-Earn" (see below) ***"Governance by the community** through the Dtravel **DAO** is one of the key differentiators of Dtravel. In order to **participate**, **submit proposals**, **vote** on submitted proposals and, ultimately, have a say on **decisions** that will influence the future of Dtravel, TRVL token holders (including hosts and guests) must assign TRVL. Each member's **voting power is dependent on the amount of TRVL assigned** by the member."	*Platform **access**: **pay** platform **subscription fee** and get **discounts** on fares for riders and platform subscription fees for drivers. *"Participate in **platform governance** -DRF token holders can create proposals and vote for new features. Franchise contenders have to **stake** DRF tokens to win FNFT auctions and consequently the rights to run operations in a region. This FNFT gives them **admin privileges** to govern platform operations in their respective regions." *Earn **Interest** by staking - **Delegate** to Franchise owners - Drivers and Riders can delegate their DRF tokens to be staked on their behalf for Franchise candidates in return for a pre-decided revenue share *"Tokenize the ridehailing economy using various on-chain digital assets of both fungible and non-fungible nature. The native platform utility tokens are used for **gamifying loyalty**, **rewards** and **incentives**, while stable tokens are used for **on-chain macro and micropayment transfers**. The native platform utility tokens are meant to be staked for acquiring **Franchise** NFTs or FNFTs which provide the franchisee rights to use the name and system of Drife."	*"DTC is a **utility token** used to **post**, **vote**, **tag** and **promote** videos on the DTube platform. DTC token holders can **influence content** exposure in 2 ways: 1) Hold DTC to generate VP; Burn DTC to promote video posts" *"DTube Coin" (DTC) is a utility token that distributes "**Voting Power**" (VP) every hour (+1 VP per DTC owned). Users need to purchase the first DTCs to start **playing** and VP accumulates in every user account every hour." *"In real time, the blockchain algorithm generates and distributes new DTC to users to **reward them according to their vote popularity**. The more users follow one's vote, the higher the reward in DTC." *"In the future, we will offer users to be able to spend their voting power upon social projects, **turning passive viewers into positive social contributors**." *"Voting power is used to influence 2 things: **Content exposure** -- Content is ranked by total voting power spent by users; **Rewards** - Voting power impacts the number of tokens generated by the vote. On this model, influence (over content exposure and rewards) is materialized in a token and distributed to users for their most relevant votes. The more users follow one's vote, the more tokens one earns." *"DTube Coin (DTC) is a **fully liquid and freely tradable crypto asset** (expected Q3, 2019). It represents the value users can trade with each other; Voting Power (VP) is the **voting token used to play the curation game**. The curation game means users will spend their VP (i.e. influence) to post, vote and tag content in order to earn DTCs and influence content's ranking on the platform. VP is not a tradable asset and has no value outside the DTube platform". *"DTube Coin (DTC) is a utility token that distributes Voting Power (VP) every hour (+1 VP per DTC owned). VP accumulates in the user's account every hour. Users need to purchase the first DTCs to start playing. Users can then spend their VP to post, vote, tag and comment on videos. In real time, the blockchain algorithm generates and distributes new DTCs to users to reward them according to their vote popularity (the more users follow one's vote, the higher the reward in DTC)." *"Updated **Proof-of-Brain distribution mechanism**; Tokens are created and distributed in real time. The number of tokens created every day depend on how many active accounts exists on the network ("active" means at least holding 1 unit of token). Votes (Voting Power -VP in our case) is an account-binded asset that is produced every hour at a rate of +1 VP per token you hold per hour. Users can then spend their votes on contents they can rate (upvote/ownvote), which influences the distribution and who earns what. Bandwidth works similarly to VPs in the way it generates off the liquid token (DTube Coin)."	*"Minds tokens will be used to **deliver services** on Minds, including Boost and Wire, with smart contracts that are **cryptographically secure and transparent**, as the contract terms may be verified and audited by anyone. This provides the community with a true **peer-to-peer, decentralized token** that enables autonomous and **independent relationships** between creators, supporters and advertisers. The added dimension of incentives and rewards encourages users to share their content and be active on the network. Minds tokens may be used to subscribe to exclusive content, tip other users for their quality content, or purchase advertising views from the network or a specific channel's audience." *The services include: - "Boost: An **advertising** network where users exchange tokens for views on their content or channel." - " Wire: A **peer-to-peer payment** system where users exchange tokens for tips and content subscriptions." - "Plus: A recurring monthly service that provides **premium channel features**, such as no ads." - "**Hosting**: Build your own white-labeled social network using Minds source code." - " Affiliate Rewards: Third party affiliate program to enable **distributed rewards** for your business and customers." *"Minds tokens will be immediately usable upon receipt on day one. They will be **required** for use of the application through immediate integration into Boost, a **transparent** and **blockchain-based ad network**, and Wire, the Minds peer-to-peer payment system. Both Boost and Wire will leverage smart contracts to enable the **autonomous exchange** of digital media and services for crypto-tokens, creating a radical shift in how social networking ecosystems and marketplaces operate in the 21st century." *"The implementation of crypto-tokens with the reward system allows users and developers to translate their time and energy into tokens that hold real, lasting value on the Minds platform" *"Minds also provides content creators with the ability to **manage relationships with advertisers directly** through the peer-to-peer Boost feature. Peer-to-peer Boost is a paid promotion tool, where users can send offers of Minds tokens to other users in exchange for a guaranteed placement of content to their audience that can never be deleted." *"Every Minds token transaction will establish a **direct, peer-to-peer relationship** between advertisers and content creators with a smart contract. This enables creators to autonomously own the relationship with their advertisers and eliminates any risk of third party interference or demonetization." *"peer-to-peer revenue model is **recurring subscription payments**. For recurring subscriptions to be possible on the blockchain, pre-approvals must be made to the Wire smart contract so that funds are able to be claimed at later dates. However, the pre-approved amount is not reserved by the Wire smart contract, so the sender will still maintain full autonomy and **ownership** of their funds." *"Minds is an ideal platform to build a **tokenized economy** by **monetizing ideas and consciousness** and sharing them across the Internet. The economy is designed to **reward** the channels who are contributing the most to the network through their content, development and thought leadership. The result is real tokenized data to quantify and reward the prevailing voices on the platform."	**Token utility**
	Community member	*Anyone who **holds** a TRVL **token**	*Anyone who can **stake tokens** to propose suggestions or vote	No info.	No info.	**Community member**
	DAO	*Dtravel DAO will have a **Representative Council**, with members elected by TRVL holders (including hosts and guests who choose to participate). *Initially, as the Dtravel DAO's governance features are not live yet, the Dtravel DAO Representative Council was **elected by early contributors**. ***Community DAO**	*The platform itself is governed by a DAO where **token-holders can participate** in decision making by putting forth proposals and voting on them. *Drife Ltd./Drife Foundation - mentioned but no information can be found	No info.	No info.	**DAO**
	Use of blockchain tech	*"cryptocurrencies for payments" *"smart contracts to automate its operations" ***"tokenomics** and decentralized governance to align the interests of hosts and guests and reduce tensions."	*Biconomy to eliminate gas fees for users *NFTs for **franchising** ***Tokenized rewards** ***DAO** to govern	*Avalon social ledger which **enables their voting power and reward structure** *"It uses a **Delegated Proof-of-Stake (DPoS) consensus algorithm**" *"The base of this mechanism is an **algorithm that creates and distributes cryptocurrency tokens** to reward each participant for their contributions (posts, votes and tags). Each of these tokens bear a utilitarian value by **generating voting power** (VP) and **bandwidth** to its holder with time; The more tokens held, the faster the resource generates. This mechanism protects Avalon from Sybil attacks (e.g.: creating multi-accounts to cheat the numbers of votes), which classic social medias are victims of." *"Bandwidth is used to write transactions on the blockchain. Each byte from the transaction is deducted from the bandwidth balance and a user is unable to transact if he doesn't have enough bytes available."	* "Boost, a transparent and **blockchain-based ad network**, and Wire, the Minds **peer-to-peer payment system**. Both Boost and Wire will leverage smart contracts to enable the autonomous exchange of digital media and services for crypto-tokens" * "A **crypto-contribution economy** running on the blockchain is a direct response to feedback and demands from the community and will have a positive impact on the network by incentivizing contributions, increasing revenue opportunity and providing an additional layer of **transparency** and autonomous operations." * **Decentralized architecture**	**Use of blockchain tech**
	Main stakeholders	*Co-founders (Airbnb, Google, Uber, Expedia etc.) *Investor (Airbnb, Google, Uber, Expedia etc.) *In the future - token holders	*Co-founders *Investors *Partners *In the future - franchise holders *In the future - other token holders	*Founding members *Investors (Incl. Steem, Inc co-founder Ned Scott) *Users *Creators *Advertizers	*Management *Team *Token holders *(Advertizers)	**Main stakeholders**

	Network Effect	*"DTravel's effective **total fees are significantly lower** than competing home-sharing platforms' published fees of up to 20%. *Positive **feedback through tokens** *Decreasing friction through **interoperability**/**collaboration** with parketplaces such as Uniswap and PancakeSwap, Travala etc. *"**Support-to-Earn** enables community members to become **contributors** and/or **ambassadors** by **exchanging their time, expertise and loyalty for TRVL tokens with real value**. The initiative can be applied across many aspects of Dtravel, from community building and forum hosting to various aspects of customer support and operations, as well as educating and helping new members who join Dtravel. More information on Dtravel's Support-to-Earn program will be published in the near future." *"The primary ways to receive TRVL for **loyalty** at the very beginning are simple: join the Dtravel community as an **early bird**; help the community grow by referring others to Dtravel. A total of 25,000,000 TRVL will be distributed through these onboarding programs. (Early Bird Call, Referrals)" *"To promote the growth of the Dtravel community, the Dtravel DAO will be launching a series of **GameFi Growth Actions** funded by the Growth Fund. Members who participate in these actions will be **rewarded** with TRVL tokens and special NFTs." *"Dtravel will consider **airdrops** of TRVL to other communities that have a **high synergy potential** with Dtravel."	*"The **interoperability** of microservices and smart contracts is crucial in building a unique platform that leverages blockchain technology for overcoming significant platform-centric issues facing ride-hailing applications these days. Drife has both Android and iOS applications for riders and driver-partners. *Rider App Driver App / Franchiser - different apps potentially **hampering side-switching**." *"Both the drivers and riders can earn **incentives** within the Drife platform for their active participation and engagement with the platform." - feedback loops and increasing value to retain users *"In an attempt to empower the participants within the ride-hailing economy, Drife strives towards building a **strong community** of value creators and extractors in its ecosystem - the platform drivers and riders. Drife's referral program is a step in that direction. Its primary intent is to **incentivise community building**, and for creating sustainable incomes for its partners and benefits for its users. **Referrals** in Drife are of the following types: Upon being referred to the Drife platform by a "Referrer," the "Referred Persona" is registered onto the network. The account name is used as Referral ID as it is unique across the network. The Referrer's account name is linked with the Referred Account. In case when someone requests to join the network without a Referral (and Referrer), the "Drife Franchise Referral Account" becomes the referrer by default. For each of the two parties involved in a ride transaction, there are their referrers. They could either be platform users' (rider/driver) accounts or the "Drife Franchise" account. And for each of the personas, there should be a separate component in the 2% Incentive Component of the ride fare."	*"Avalon is designed to build social media platforms with **mass audiences** and can handle up to 10,000 transactions / second on enterprise-grade hardware. **Scalability** is similar to other DPoS (Delegated Proof of Stake) blockchain like TRON, STEEM or EOS." *"Users on the DTube Chain will now earn 1 single liquid cryptocurrency token: the DTC (instead of 3 on Steem). Spending Voting Power (VP) is simplified and all rewards are collected in real time" *"On Steem, users need to manage many different types of private keys (active key, posting key, transfer keys etc.), 3 different tokens (steem, steem power, steem dollar). Plus, the onboarding process is either long or expensive (...) **Creating an account on DTube Chain will be instant** and as easy as 2 clicks (versus a few weeks on Steem)" *"DTube posts are [were previously] exclusively original content from non-professional vloggers and video makers. They are mostly focused on the Steem and blockchain communities. Not sufficient to aim at mass market. (...) The Steem setup is not suitable to deliver mass adoption for the model: reward distribution (creator/curator reward split is 75%/25%), big early user advantage leading to bad distribution, short monetization window (a content can only be monetized over 7 days), token illiquidity (tokens need to be staked 13 weeks before use), voting limits (voting power caps after 2-5 days of user inactivity, need to vote 10 times a day at least). (...) On DTube Chain, the **incentive to join the network remains constant even while the user base grows** as the daily DTC rewards distributed are correlated with the number of active users (the more active users, the more tokens distributed). This is **in contrast with classic maximum supply token models** leveraging the "**early user advantage**" (where the incentive decreases over time)." *"While more than 400 DApps and 1.2 Million accounts currently use the Steem blockchain, scalability is a big issue as the token inflation is fixed, bandwidth generation is limited and the economic setup is not customizable for improvements. (...) "DTube Chain, which is exclusively dedicated to the DTube app, **can handle thousands of transactions per second** (i.e. tens of millions of daily active users). On Steem, DApps need to share bandwidth generation which limits the overall capacity of each app." *"On Steem, the daily **token reward pool** is split between "**creator rewards**" (rewarding posts) and "**curator rewards**" (rewarding votes). To make it more rewarding for the core userbase (99% of users are voters), DTube Chain will allocate 100% of the reward pool to votes (and tags). (...) On DTube Chain, **VP stacks up indefinitely to incentive returning visitors** (on Steem, voting power caps after a few days of user inactivity)." *"market demand for the DTC will be led by 2 types of investors: **users** and **advertisers**" *"Token sale – Event organized to offer early investors the opportunity to buy crypto-assets (DTC) vs. monetary investment; **Token launch** – At launch of the DTC token economy, the DTube Chain will start at block #1 and distribute the initial monetary mass to all stakeholders (investors, community, team, etc.)"	*"The goal of the initial event is to **reward users** for their efforts thus far and to **jump-start the Minds token economy** with enough immediate distribution to sustain network activity during the transition phase." *"Minds will mint tokens on an ongoing basis to **reward the community for their contributions to the network**. The token supply is engineered to **scale autonomously** with the growth of the network. Tokens that are reclaimed for Minds services will be recycled into the reward pool or sold in order to help replenish the token supply. We will also occasionally run promotional airdrops of tokens to reward users and **incentivize** certain activity on the network." *"The proven philosophy that Minds has always acted upon is one of community-driven code evolution and putting users first. This model **maximizes network effect** because it **benefits the most users and inspires an ethos of contributionism and meritocracy**. Network activity will always be the main determinant of the distribution, but Minds will likely evolve the code on occasion. All changes will be published publicly for full transparency and all users are encouraged to make software submissions." *"Additionally, creators earn Minds tokens by **referring** new users to the site. This equals an added benefit of an accelerated network effect."	**Network Effect**
	Openness	*C**ore team** for blockchain engineering: @fs, @devil, @toma; Strategy and opertions: @perite_mereno, @nomad, @unicorn *"The Dtravel DAO Representative Council is responsible for the **overall governance and strategic direction** of Dtravel, and for delivering accountable performance in accordance with the Dtravel DAO goals and objectives, as set out in the Dtravel DAO Constitution." *"Since Dtravel is a DAO, TRVL **token holders can choose to participate directly in the development** and success of Dtravel by: Voting on Dtravel Improvement Proposals ("Dtravel IPs"), Submitting Dtravel IPs, Contributing to the dialogue regarding product, platform and ecosystem improvements through governance communication channels." *"As a **community member, you are eligible to participate in the Dtravel DAO** by: Voting on Dtravel IPs, Submitting Dtravel IPs, Applying for grants from the Grants DAO , Participating in Support-to-Earn programs via the Community DAO , Voting in elections for Representative, Council members , Contributing to discussions within the Dtravel community to improve the Dtravel experience for hosts and guests using the platform." *"The **Dtravel DAO will work with the community** to continually design more opportunities that will **further enable community members to participate** in the governance and growth of the Dtravel ecosystem" *"Dtravel has audacious goals to become one of the largest DAOs operating outside of the crypto-native economy. As Dtravel grows, so will its level of decentralization for resource allocation and operational functions. Initially, the Grants DAO and the Community DAO will be managed by early contributors. Over time, as Dtravel grows its member base, both the **Grants DAO** and the **Community DAO** can **elect** their own Representative Councils and secure funding to **operate autonomously** from the Community Treasury and Community Growth Fund, further assisting in the decentralization of the control of Dtravel." *"The Grants DAO will facilitate the **application, issuance, and reporting of grants** to the Dtravel community. The **outcome of proposals** will be determined by the Representative Council. The grant funds will be provided by the Community Treasury. The Grants DAO will also support the Representative Council by facilitating Dtravel IPs, governance discussions, voting participation and reporting. All grant applications need to **demonstrate that they add value** to the Dtravel platform and/or ecosystem. **Any community member can apply** for a grant by submitting a Grants DAO application." *"To ensure the **alignment of the long-term vision** of the Dtravel DAO with that of the Dtravel community, it is important to ensure that both hosts and guests have TRVL tokens which enable them to participate in the governance of the Dtravel platform. To achieve this alignment, the Dtravel DAO has allocated 90 million TRVL tokens (9% of the total supply of TRVL tokens) to be distributed as rewards to hosts and guests. These funds will be sourced from the Community Growth Fund." *"**Governance by the community** through the Dtravel DAO is one of the key differentiators of Dtravel. In order to participate, submit proposals, vote on submitted proposals and, ultimately, **have a say on decisions** that will influence the future of Dtravel, TRVL token holders (including hosts and guests) must assign TRVL. Each member's **voting power** is dependent on the amount of TRVL assigned by the member."	***No information on how to take part in development,** but a lot of funding goes to development. *C**ore team** for blockchain engineering: Mudit Marda, Rakesh, Sahu, Yogesh Bansiwal, Nitin Raghukumar. *"At Drife, we are not just creating a platform for service providers and receivers; we are creating a **self-sustaining ecosystem** where every stakeholder plays a vital role in its growth and healthy maintenance. Drife is built with the philosophy that one centralized network operator cannot know what is better for a region than its local community. For this purpose, Drife brings in a **franchise model** to decentralise operations of the platform across various locations of the world. By participating in this unique NFT based franchise model, entities like riders, drivers, fleet owners, and local transportation and logistics companies can govern themselves in the most efficient and fair way. Drife is thus giving drivers and riders a voice that has been snatched away by the suppressing centralised governance ride-hailing companies through token staking for network ownership, and also by making proposals and voting on them." * "The following are the **key smart contracts** that drive the platform along with their basic functionalities: - Ride Contract - **Manages ride flow, maintains ride states and details**, used by users for requesting and booking rides, receives ride rating from riders and drivers. - **Fare** Contract - Calculates base fare, stores fare details for rides, enables fare negotiations and auction-based dynamic pricing, computes final chargeable fare, maintains fare parameters for different cities and vehicles, handles fare payment by splitting and disbursing to different beneficiaries. - Utility Token Contract - **Creates, issues and transfers DRF tokens**. DRF is a fungible utility token used for loyalty management and rewards, staking to win Franchise NFTs, accessing platform-specific features and availing discounted services by riders and drivers on the platform. - Stable Token Contract - Multiple such contracts exist for **managing stable tokens** backed by fiat money like INR, USD, EUR, etc and having a variable supply used for making fare payments within the Drife Platform. Each of these has functions for minting and burning stable tokens, transferring tokens between different accounts, holding frozen tokens. - User Service Contract - Used for **onboarding users** and for storing user details such as ratings, ride count, referrers, dues, etc. Also responsible for handling stable token deposits and withdrawals from user accounts against bank transfers in and out of the system, and for adding and clearing rider dues related to a particular ride. - **Franchise NFT** Contract - Minting and managing unique, non-interchangeable and non-divisible pieces of geographically bounded and geo-fenced units of operations as Franchise Non-fungible Tokens or FNFTs."	*"Blockchain, **decentralized infrastructures** and **open source software** can re-create **trust** by offering data immutability (this defends against censorship), **transparency** (against corruption) and **privacy** (no need to collect personal data)." *"**Collaborative – Anyone can contribute** to the existing project by proposing an update or can just copy the code to launch a new application." (On open source) *"On DTube, users **post**, **vote**, **comment** and **tag** content. **For each contribution, they may earn a reward in cryptocurrency tokens**. Tokens can then be used either to **promote** content on the platform or **exchanged** against value (currencies, goods, services)." *"**Avalon blockchain is open-source**" *"Our approach with Avalon was to build an **open source**, **customizable** and fully scalable blockchain for social distribution. Avalon is media agnostic which means **any web or mobile app developer could use Avalon to build his own social blockchain setup** following our principles. Based on Avalon we are launching **DTube Chain, a specific blockchain for video content**. " *"Voting power is used to **influence** 2 things: **Content exposure** – Content is ranked by total voting power spent by users; **Rewards** – Voting power impacts the number of tokens generated by the vote. On this model, influence (over content exposure and rewards) is materialized in a token and distributed to users for their most relevant votes. The more users follow one's vote, the more tokens one earns." *"On Steem, the daily token reward pool is split between "**creator rewards**" (rewarding posts) and "**curator rewards**" (rewarding votes). *"Our team is composed of **highly skilled founders supported by a strong community of contributors** from all around the world: Dapp **developers**, **designers**, **curators**, **translators**, **evangelists**, **influencers**." *"**Hundreds of skilled supporters are helping** with **translation**, **moderation**, **curation**, **coding** and **design**. Connect with DTube **community** on Discord." *"**Staff** Tech & Product Jeremy: 11 years as a senior expert and full stack engineer, **he** developed DTube video encoding stack; Andrè: experienced mobile app developer, notably developed Aramis Auto onboarding app, the largest online used car retailer in Europe. **He** is currently developing DTube iOS mobile App; Elie: UX designer for Dailymotion, BWin, **he is in charge** of the new DTube redesign. Project Philippe: C-level position in fast-growing start-ups and ex-strategy consultant, **he is in charge** of user growth and partnerships. Worked for Google and La Ruche Qui Dit Oui!, European leader for decentralized food distribution" Marketing & Communication Berk: **active member of the community**, **he is the chief of** community relations and manages curators and the way @dtube spends its voting power - Discord: @Steeminator3000#4470; Alban: 7 years as Art Director in renowned creative agencies, **he is our designer in chief;** Céline: **head of** communications and marketing, she has a strong experience as head of digital and communications in agencies like HAVAS"	*"The platform is built on **open source code"** (Apache). *"In the Minds contribution economy, **users and developers will be rewarded for a variety of contributions** to the network including generating high quality content, account setup and verification, referring new users, maintaining an active channel, finding bugs, successfully submitting code and more." *"One of the most important elements of the Minds network is **transparency**. All of our code is **100% free and open source** which allows for **rigorous peer review, audit and collaboration**. Minds is attempting to build a fair and democratic system by tying the token distribution directly to the demand and activity of the network and by giving all users equal opportunity to contribute and earn. **Founders, advisors and employees of Minds are not allocated any additional supply of tokens** and will be subject to the same distribution rules as the rest of the community. Every user's vote counts for the same amount, and every voice has equal ability to be heard. The key for any fair economy is for everyone to have an equal chance at making it to the top. Success on Minds is measured by unique daily interaction for maximum fairness and reward integrity as opposed to other models that give the users with a higher token balance more voting power. **The Ethereum blockchain is governed by the Etherum governance compendium** for all improvements, project management and technical decisions regarding the blockchain and its infrastructure." *"Minds is one of the few social networking platforms that truly embodies the **transparency** movement by **keeping the entire software stack free and open source (and not just the added blockchain or token layer)**." *"Minds has **managers** in their team. Minds is also currently looking to **employ people in several senior roles** which will act as managers in different regards. This makes them less open on the manager level. They are also employing developers, making those roles less open as well. However, some of the rules include "engaging with the open source community", which makes us think that at least the developer role is open on som levels, exactly how is unclear.	**Openness**
	Architecture	*Value unit: Home sharing *Filter: Reviews and tokens *Pull: tokenization and loyalty programs *Facilitate: Platform, interoperability with token marketplaces, colaborations with other web 3.0 initiatives, e.g. Travala *Tokenization beyond core interaction *Exchange of information: Through website; Echange of services (value unit): Home sharing provided by booking tools and (soon) token used to pay for tickets bookings, for passport etc./IRL; Echange of currency: tokens and fiat money, payment tools are not yet set	*Value Unit: Ride-sharing *Filter: Users choose their drivers and riders *Pull: Rewards, referral system, tokenization *Facilitate: FNFT to enable users to set up Drife in new cities (franchising) *Tokenization beyond core interaction *Exchange of information: Through app; Exchange of service: IRL where ride takes place; Exchange of currency: Through app	*Value Unit: Video content *Filter: Reward system *Pull: Rewards system, tokenization *Facilitate: Steem compatible, Avalon blockchain, DTube Chain transaction capacity *Tokenization beyond core interaction *Exchange of information, service, and currency is all supposed to happen on the site or in the application *"The success of an online video platform lies essentially on the quality and quantity of its available catalogue. To compete with major players, we will launch a decisive new sharing feature and use DTube Chain to add a **new layer of crypto monetization**." *"Curators can now not only curate videos on DTube but also share a **link from any video publisher** (e.g.: YouTube, Vimeo, Dailymotion, Liveleak, etc.), as it works on sharing platforms such as Facebook, Reddit or Pinterest. Creators will be able to import the best videos of their catalogue more easily."	*Value Unit: Social media content *Filter: Possibility to boost content *Pull: Rewards system, tokenization *Facilitate: Using an ERC-20 token which is interoperable, automization, and enabling off-chain storage *Tokenization beyond core interaction/Layering of functions *Exchange of information, service, and currency is all supposed to happen in the application. *"Blockchain technology and other tools for decentralized architectures are still young. Many centralized services remain beneficial for user experience and scalability, among other things. Minds has adopted a hybridized approach that incorporates both centralized and decentralized architectures to capture the benefits of each. Our criticism of mainstream networks revolves mostly around lack of transparency and commitment to decentralizing power. For this reason, Minds has taken the initial step towards decentralization with its monetization system.	**Architecture**
	Monetization	*"Furthermore, all collected platform fees will be forwanded to the community treasury, which is under the Dtravel DAO's control, thereby creating a strong value proposition for TRVL token holders, hosts and guests." *"The TRVL token is the **native token** of Dtravel, powering its **self-driving economy.**" *"The demand for TRVL is driven by the natural incentive to use TRVL to enjoy its 4 purposes." *"The **maximum supply** of TRVL is fixed at 1,000,000,000 (1 billion)." *"The Token Distribution has been designed to ensure **gradual increase of the circulating supply** of TRVL, to align the interests of the community, investors, core contributors and advisors, and to ensure long-term sustainability." *"Both **fiat currencies and cryptocurrencies** are accepted for payments." *"Host properties are protected by a **Protection Pool** for up to 1,000,000 USD (or more)." *"Dtravel's total fees are initially set to be only 10%. Through **cashbacks** when TRVL is used for payments, the effective total fees can become as low as 5%. Participation in growth actions may bring the effective total fees to 2%." *"We offer **staking vaults** to earn TRVL with various **lock-up conditions** on both Ethereum and BNB Smart Chain. See below for full details on vaults." (https://earn.trvl.com/)	*"Rather than charging the driver-partners commissions to cover the costs for operating the platform and for the services provided, Drife instead adopts a **subscription model** to provide them with access to the platform. These driver-partners pay recurring subscription fees to the franchisee controlling operations at their location. The Franchisee in turn **shares a fraction of the generated revenue** with the Foundation."	*As seen, **advertisers**, **brands** and **promoters** are offered to promote content by burning tokens. They will be able to **buy tokens on exchanges to promote specific content giving it more exposure**" Uses **tokenization as large share of monetization strategy**: *"Use DTC to promote videos: DTC is a cryptocurrency token offering its holder the power to influence content exposure on DTube platform (the more VP a video receives, the higher it ranks). **DTC total circulating supply and market exchange price are the two elements that will determine the overall market capitalization of the ecosystem**. DTC circulating supply is impacted by 2 **triggers**: **Token creation** (set by user growth): the blockchain distributes DTC every day to reward user's interactions. The rewards pool is determined every 24h by the number of active users; **Token burning** (set by "promote" feature): users burn (i.e. destroy) their tokens using the "promote" feature when posting content to boost its exposure; **DTC market price is impacted by market take-up and sell orders**: Buy orders are placed by users willing to increase their VP generation rate, hence their impact on content ranking; Sell orders are placed by users willing to cash-out their DTC earnings. There is a counter-incentive to sell tokens as it reduces VP generation rate." *"DTube Coin is a cryptocurrency utility token that will **hold value in 2 ways**. On the **DTube platform** – DTC gives its holder the ability to post, curate and promote online videos; **Outside the DTube platform** – DTC will be freely tradable for other currencies on online exchange markets. The economic principle is to attract users with DTC rewards (for posts, votes, tags) and offer them to "topup" more DTC (on online exchange markets) to increase their Voting Power. This aims at creating a sustainable demand for the DTC on markets, hence increase its overall market capitalization." *"A few **definitions**: DTC circulating supply (or monetary mass): total volume of DTC tokens emitted at present date; DTC exchange price: price at which the DTC is traded to other currencies on online exchange markets. It is determined by market take-ups and sells and is commonly presented in USD and BTC (full list of cryptocurrencies market prices: https://coinmarketcap.com) DTC market capitalization: total market value of DTC circulating supply (circulating supply * exchange price); Online exchange markets: online platform offering currencies trading services (crypto-crypto and crypto-fiat). Thousands of these markets exists which can offer various "trading pairs" , commissions and exchange prices for the pair." *"To summarize, here is an overview of the **global economic cycle led by the 2 principal dynamics: The evolution of the monetary mass; Market capitalization**" *"**Free to play** – Give players an incentive by playing the game for free: Add-on purchases – Offer players to buy in-game digital goods or services; For example upgrade a character outfit (League of Legend, Fortnite), play the next level (Candy Crush), subscribe to a channel (Twitch)." *"NB: DTC transfers are **0-fee** and take 3 seconds maximum to become fully validated"	*"Last year, Minds raised over $1 million from more than 1500 **individual backers**. It otherwise **relies on revenue from people buying boosts**, and a potential payday if Minds cryptocurrency gains in value." https://www.wired.com/story/minds-anti-facebook/ (2018) *"Minds operates under a new business model that **fairly rewards users** for their contributions to the network with revenue and expanded reach. Additionally, Minds provides content creators with the tools they need to successfully **monetize their content independently with their peers**. These tools include crowdfunding, paid subscriptions, ad revenue-sharing, tipping, peer-to-peer advertising and a proven contribution-driven reward system." *"By coupling **peer-to-peer monetization tools** with a properly structured, **incentive-based reward system**, Minds has built a **sustainable digital economy** that effectively rewards the users who contribute the most to the network."	**Monetization**

PLATFORM REVOLUTION FRAMEWORK	**Governance**	*"**Governance by the community** through the **Dtravel DAO** is one of the key differentiators of Dtravel. In order to participate, submit proposals, vote on submitted proposals and, ultimately, have a say on decisions that will influence the future of Dtravel, TRVL token holders (including hosts and guests) must assign TRVL. Each member's voting power is dependent on the amount of TRVL assigned by the member." *"The Dtravel DAO **Representative Council is responsible for the overall governance and strategic direction** of Dtravel, and for delivering **accountable performance** in accordance with the Dtravel DAO goals and objectives, as set out in the Dtravel DAO Constitution." *"Dtravel directly addresses the challenges faced by the home-sharing industry by being characterized by: **Disintermediation**: Dtravel's platform seeks to foster a true marketplace for hosts and guests, where communication is free and the inherent peer-to-peer experience of home sharing is encouraged. **Low fees**: with nominal total fees of 10% and effective total fees that can be as low as 5%, Dtravel's fee structure is affordable and community-governed. **Fair distribution** of value arising from synergy: all the effective total fee revenue goes to the Community Treasury, thereby being distributed to the very community that generated the synergy and its value. **Decentralized dispute resolution**: Dtravel will decentralize dispute resolution through its Support-to-Earn approach. **Clear rewards**: community members with premium membership and star hosts and star guests receive tangible rewards in TRVL and a member's loyalty is rewarded with cashbacks. **Transparency**: by adopting Web3 technologies and the ethos and practices of blockchains, cryptocurrencies and DAOs, Dtravel will naturally inherit high transparency." ***The TRVL Ecosystem**: Travala, DTravel, Mexc, Bybit, Kucoin, gate.io, PancakeSwap, Uniswap." *"The TRVL token is used to **protect** the Dtravel community from malicious behaviours through the following mechanisms: Extra Protection from Protection Pool, Host and Guest Alignment, Contributor Alignment" *"The Community DAO is focused on **decentralizing and incentivizing workflow** within the Dtravel ecosystem. This includes facilitating self-selecting work initiatives, such as Dtravel's Support-to-Earn initiative." *"To **incentivize hosts** with exceptional performance to join Dtravel, this growth action will distribute TRVL to hosts who satisfy the following eligibility conditions" *"To **incentivize guests** with exceptional performance to join Dtravel, this growth action will allocate TRVL to guests who satisfy the following eligibility conditions"	*"Franchise owners can **govern local operations** by configuring the smart contracts appropriately using the FNFT leased to them. Being a local entity, franchisees can work with the best interests of drivers in mind and make the best decisions for the community." *"The platform itself is governed by a **DAO** where everyone can participate in decision making by putting forth proposals and voting on them." *Drife Foundation - not possible to find who they are, but they have a lot of power: - Holds the Drife IP (they are the ones franchising, the franchisor) - Makes decisions on minting FNFTs "we will strategically mint FNFTs for locations across the globe" - Specifies DRF threshold to be able to be franchiser - Receivers of license integration fee paid by franchisee - Shares revenue with franchisee (10-20 % of turnover) * See Openness for contracts used to govern the different interactions	*"The lack of transparency creates distrust: social medias show no transparency of their algorithmic content distribution, revenue sharing or use of personal data." (...) "**Re-create trust with a censorship-free decentralized hosting infrastructure**, fully **transparent** and **open source** code and **no collection of personal data**. *"Automated moderation is inefficient: social medias proved inefficient in blocking inappropriate content(thus tackling brand association risks for advertisers) and letting creative work thrive (without censorship or "demonetization"). Manual moderation by employees doesn't show better results." (...) "**Community-powered moderation**: Content's popularity, moderation and classification is determined by user's upvotes, downvotes and tags without algorithmic alteration." *"Revenue sharing declines: some social media share revenues with content creators but most of them don't and monetization thresholds are increasingly hard to reach. Regular users are not compensated forbeing marketing targets" (...) "A **token model to reward all users**: A "social blockchain" mechanism **distributes cryptocurrency token rewards to all users** (creators, influencers, viewers) **for their social contributions** (post, vote, tag)." *"We respect user **privacy** by **not collecting any personal data** and we do **not alter user experience with suggestions, intrusive ads or censorship**" *"We **provide our community the tools to control content distribution** and protect their **freedom of speech**." *"Our code, community rules and reward mechanisms are **fully transparent**." *"**We distribute 90% of all platform revenues to its users**." *"Through the development of our technologies, we take special care in impacting the environment as little as possible. Our blockchain is designed to operate with a much **lower footprint on energy consumption** than Proof-of-Work consensus blockchains. In the future, we will offer users to be able to **spend their voting power upon social projects, turning passive viewers into positive social contributors**." *"**Collaborative models appealing to the community** proved very successful over time by leveraging the power of user's contributions (**sharing** goods or services, car-sharing, community reviews, open source code contributions, etc.)." *"With Avalon, **content is ranked exclusively by user's upvotes, downvotes and tags**. A popular piece of content (i.e. with lots of upvotes) goes up in its category to gain more exposure and a submission with a negative score is automatically hidden. **Adult content is tagged "NSFW"** and hidden by default (an account is required to view this content); **All platform moderation guidelines come from a community consensus**." *"NB: As for DTube, **our curation team overlooks uploaded content** and complies in cases of a written and rightful **take-down notice**. We only had to take **20 actions in 2 years'** time out of 1 video uploaded every 3 minutes." *"A platform reward (commission) can be set on Avalon blockchain for the purpose of covering costs of the teams developing the platform (development, marketing, corporate, legal, partnerships and social projects). This **reward comes on top of the classic distribution of tokens to users**. On the DTube Chain, **10% of total DTCs distributed to users are created and sent to the @DTube beneficiary account** (the first account of the blockchain – created on block #0)." *"**Partnering exchanges offer**: Legal compliance - Handle all the legal structuring, Know Your Customer (KYC) investor identification, compliance with Anti Money Laundering (AML) legislations; Marketing - Advertise the project to their customer base; Listing trading pair - In return, partnering exchanges will list the token and take a fee on every transaction. If the project gets viral, it will increase trading for the currency, hence the exchange commission." *"In the mid-term, following the growth of DTube user base (hence DTC token holders), we **will create partnerships with consumer brands, e-commerce platforms, brick & mortar shops or any other type of services to accept price discounts in DTC**." *"DTube Chain will bear **no time restrictions on content monetization** (while set to 7 days on Steem). This is more adapted to video content (e.g.: a successful documentary can be monetized for years)." *DTube will sponsor a "**DTube Originals**" section for all verified original content creations with a dedicated DTC sponsorship pool (issued at token launch)."	*"Minds has adopted a hybridized approach that incorporates **both centralized and decentralized architectures** to capture the benefits of each. Our criticism of mainstream networks revolves mostly around lack of transparency and commitment to decentralizing power. For this reason, Minds has taken the initial step towards decentralization with its monetization system." *"Minds tokens will be used to **deliver services** on Minds, including Boost and Wire, with smart contracts that are cryptographically secure and transparent, as the contract terms may be verified and audited by anyone. This provides the community with a true **peer-to-peer, decentralized token** that enables autonomous and independent relationships between creators, supporters and advertisers." *"The **Ethereum blockchain is governed by the Ethereum governance compendium** for all improvements, project management and technical decisions regarding the blockchain and its infrastructure." https://github.com/ethereum/wiki/wiki/Governance-compendium *"One of the most important elements of the Minds network is **transparency**. All of our code is 100% free and open source which allows for rigorous peer review, audit and collaboration. Minds is attempting to build a fair and democratic system by tying the token distribution directly to the demand and activity of the network and by giving all users equal opportunity to contribute and earn. **Founders, advisors and employees of Minds are not allocated any additional supply of tokens and will be subject to the same distribution rules as the rest of the community.** Every user's vote counts for the 33 same amount, and every voice has equal ability to be heard. The key for any fair economy is for everyone to have an equal chance at making it to the top. Success on Minds is measured by unique daily interaction for maximum fairness and reward integrity as opposed to other models that give the users with a higher token balance more voting power"	**Governance**

	Launch	*__Start centralized__: "Dtravel has audacious goals to become one of the largest DAOs operating outside of the crypto-native economy. As Dtravel grows, so will its level of decentralization for resource allocation and operational functions. Initially, the Grants DAO and the Community DAO will be managed by early contributors. Over time, as Dtravel grows its member base, both the Grants DAO and the Community DAO can elect their own Representative Councils and secure funding to operate autonomously from the Community Treasury and Community Growth Fund, further assisting in the decentralization of the control of Dtravel." *"The primary ways to receive TRVL for loyalty at the very beginning are simple: join the Dtravel community as an **early bird**; help the community grow by **referring** others to Dtravel. A total of 25,000,000 TRVL will be distributed through these **onboarding programs**. (Early Bird Call, Referrals)" *"To promote the growth of the Dtravel community, the Dtravel DAO will be launching a series of **GameFi Growth Actions** funded by the Growth Fund. Members who participate in these actions will be rewarded with TRVL tokens and special NFTs." *__Roadmap__: "2021 Q4 - DTravel's Booking Platform V1 - ERC20 Contract for TRVL Token on Ethereum - TRVL Token Generation Event - BEP20 Contract for TRVL Token on Binance Smart Chain - AnySwap bridge for TRVL between Ethereum and Binance Smart Chain - ERC721 Contract for Premium NFTs - Premium NFTs Token Sale 2022 Q1 - Beginning of Early Bird Call 2022 Q2 - Booking Platform V2 - Beginning of Referrals - Mobile App - Beginning of Star Host Growth Action - Beginnning of Star Guest Growth Action Future - In no particular order: - Host and Guest Alignment requirements - Extra Protection from Protection Pool - Support-to-Earn - Contributor Alignment - On-chain Booking - Dtravel Improvement Proposals - Grants from Community Treasury for Community Projects - Bridges for TRVL to other chains Roadmap items listed above will be prioritized, added or removed in response to changes in the market and taking into account feedback and proposals by the community via the Dtravel DAO."	***Staking pool launch** ***Franchise** to launch in new areas *"Our team intends to use a substantial amount of all of the proceeds of the DRF Token Sale to launch the platform in the first city and subsequently to progress the development of the Drife Platform." (MVP) ***Pilot launch** in Bangalore (comparable to micromarket ? quite a big micro) *Roadmap: Q1 2021 Seed Round | Preparing for Pilot Launch Q2 2021 Private Sale | Public Sale | Exchange Listing | Pilot Launch in Bangalore, India with 2000- Drivers & 20000 Riders Q3 2021 Staking Pool Launch | Franchise Applications Open Q4 2021 Platform Governance enabled | Franchise to start Operations and aid Governance 2022 Onwards Franchise Launch in Tier 1 cities in India and globally	*"Before launch, we will offer investors to purchase DTC tokens through an Initial Exchange Offering (**IEO**)" *"**Roadmap** 2017: Full launch of a first MVP: a decentralized video platform running on the Steem blockchain with an IPFS uploader and a custom video player" Q3 - IPFS: Local IPFS hosting and uploads issues - UX updates - New staff: UI designer, SysAdmin, Developer, Curation manager - Channel subscription and feed - Multi-language Q4 - About page, webtorrent support, mobile responsive version, recommended videos feature, video player debug - Acquisition of the domain name https://d.tube - Improved uploader with queuing, 480p encoding, tagging, video editing. - New player with quality switch, duration display, and UI/UX improvements 2018 Q1 - New player: custom design, hotkeys, preview, thumbnails - Distribution features, watch later, channel redesign, night mode, - Steem Connect implementation - Received funding of 2 Million Steem Power delegation from Ned Scott - Launch of new logo & media kit, - Launch Discord channel - GPU encoding, 720p encoding - SEM: Server side rendering, embed support - Subtitles, channel update with user activity - Rank #1 on hacker news, - New staff: CEO Q2 - Fully open source code - Livestream - Decentralized chat - Notifications - Infrastructure clustering - Economic update (May, 7) - Launch DTube sponsorship program - DTube commission redistributions Q3–Q4 - Research & Development of a new DPoS Javascript blockchain using Proof-of-Brain mechanism: Avalon - New staff: Graphic designer, Head of growth 2019 Q1–Q2 - Launch new DTube testnet with: - Avalon Blockchain - New monetary settings - New gameplay - New features: share links from other video platforms - New staff: UX designer, Head of communications, Mobile App developer - Marketing: open official mainstream social media Q2 accounts Q3 - Full launch DTube v1 - Mobile Apps - UI redesign - DTC Initial Exchange Offering - DTC Airdrop - Launch Referral Program Q4 - Decentralized and centralized storage optimization - Browser extension - LivestreamDTC open tradability on markets 2020 Q1–Q2 - Adaptive streaming - 1080p - Launch Merchandising shop Q2 - TV App & built-in wallet - Built-in Ad exchange release" *"Token launch: **Airdrop**. After conducting the IEO as well as a test period of the economics, DTube will emit an initial set of tokens to be distributed to investors and users who have already participated in the development of DTube; This is called an Airdrop event where all registered accounts will be able to claim their amount of DTC tokens; Below, the different stakeholders taken into account in the token launch: **DTube community** – All users who interacted on DTube since inception either through voting or posting content (on Steem) and who created a DTube Chain account during the testing period; **Investors** – Investors who purchased DTCs through the IEO; **DTube corporation** – DTube will operate specific accounts to support the onboarding referral and **DTube Originals** and **influencer partnership programs**; **Team** – The founding team working on the project; **Contributors** – Curation team, Crowdin translators, Github contributors, etc." *"**DTube token launch will happen in 4 phases**: 1. **DTube Chain Testnet** (exp. June 2019). First we will distribute "test tokens" to our current users to test the blockchain and the platform's new economic model. Test tokens will not bear real value and won't be tradable; 2. **Token sale**: IEO (exp. Q3, 2019) DTube will conduct an Initial Exchange Offering (IEO) for the DTC utility token in partnership with an online currency exchange that will structure and operate all corporate and legal requirements (token classification, KYC, AML, country zone specifics); 3. **Token launch**: Airdrop (exp. Q3, 2019) After IEO and when the blockchain is battle-tested, we will reset the Chain and distribute the initial DTC assets via an Airdrop event to investors, existing users and DTube entity and team.; 4. **Open trading** (exp. End of Q3/Q4, 2019). Shortly after the Airdrop, the coin will be released for open trading on DTube platform and on partnering exchanges, users will be able to sell and buy tokens freely."	* **Beta laucnh**, starting off with an MVP to attract userd and test the app. Did not use tokens initially. * "Minds will **distribute an initial token reward** to its Beta community for their participation in Minds' development and testing processes. The goal of the initial event is to **reward users** for their efforts thus far and to jump-start the Minds token economy with enough **immediate distribution** to sustain network activity during the transition phase." * "The Minds network has steadily grown since launching Beta in 2015. The application has quickly gained 73 million unique visitors, 223 million+ pageviews, 1 million registered users and 150,000+ logged-in monthly active users (as of June 2018). The growth of the network has helped Minds strengthen its position as a viable alternative to the mainstream social networks that have recently come under public scrutiny.	**Launch**
	Metrics	*Token allocation	***Token transaction** and stake rate ***Amounts** of rides/drives ***Revenue** - in order to adapt subscription fee	*"DTube experienced an instant success and soaring traction: 4 million Monthly Unique Visitors only 4 months after launch. It has now established as world's #1 DApp for video with more than: 189,000 accounts created; 400,000 unique visitors every day on average in 18 months; World's #2 social media DApp (after https://steemit.com). Over the last two years, 100% of the traffic came from organic sources with $0 paid traffic, and drove users from all around the world."	*"Minds will sell the tokens on an ongoing basis, and proposes to adjust the price of tokens from time to time to reflect, among other metrics, the **market value of the services and benefits available in exchange for tokens,** such as advertising impressions, hosting services, Boost, Wire and Plus." *"For this reason, it is important to also **measure user attention from a 'time spent' perspective** when determining a user's contribution to the network in a given day." *"Success on Minds is measured by **unique daily interaction** for maximum fairness and reward integrity as opposed to other models that give the users with a higher token balance more voting power."	**Metrics**
ADDITIONAL INFO		*Dtravel is also working on commercial synergies with the world's leading blockchain-based online travel agency, Travala. com.	*Drife is also a registered company - Drife Ltd. https://www.crunchbase.com/organization/drife-technologies-private-limited	*"Through the development of our technologies, we take special care in impacting the environment as little as possible. Our blockchain is designed to operate with a much lower footprint on energy consumption than Proof-of-Work consensus blockchains."	* "Minds will offer users the choice between OnChain and OffChain transactions. OnChain transactions benefit from being published and secured on the public blockchain, while OffChain transactions benefit from speed and no transaction fees."	

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